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Philippine island. Vol. I. 1923

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# **SURFACE WATER SUPPLY OF THE PHILIPPINE ISLANDS, 1908-1922**

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## **SCOPE AND IMPORTANCE OF WORK**

This bulletin contains the results of measurements of the flow of certain streams and irrigation ditches in the Philippine Islands during the years 1908 to 1922, inclusive. The investigations leading to the report were made by the Irrigation Division of the Bureau of Public Works as a part of a general plan for ascertaining the water resources of the Philippine Islands and the extent to which lands could be made more productive by irrigation.

The Irrigation Division was created by Act 1854 of the Philippine Legislature which also authorized "the appropriation of seven hundred and fifty thousand pesos annually for the promotion, establishment, and maintenance of irrigation systems in the Philippine Islands." The hydrographic work was supported by appropriations by this Act until December 31, 1914, when the lack of funds necessitated the discontinuance of the work and the suspension of most of the activities of the Division.

The Irrigation Division was reorganized in June, 1918, and the hydrographic investigations have been extended since this time to include most of the important streams for irrigation and water power development on the Island of Luzon and in the Visayan Islands. A number of gaging stations are also being maintained on streams on the Island of Mindanao.

The investigations heretofore conducted by the Irrigation Division are not complete nor do they include all the representative streams that might have been advantageously studied. They include, however, as many of the important streams as the available appropriations and personnel would allow. Accurate data of the discharge of streams are of vital importance in the study of irrigation, domestic water supply, and water power projects, and in the adjudication of water rights. The maximum or highest flow must be known to make safe designs of dams, roads, bridges, and many other structures to be built in the Islands. The minimum or lowest flow is essential to decide whether or not water has to be stored, or to determine

the feasibility of domestic water supply and hydro-electric projects. It is therefore necessary that records of stream flow be kept over a period of years long enough to determine within reasonable limits the range of flow from the maximum to the minimum. Experience in other countries has shown that this period varies for different streams and that record should be kept from 10 to 30 years.

In the performance of this work an effort was made to secure accurate results consistent with a reasonable expenditure of time and money. It is to be regretted, however, that the lack of a sufficient number of trained hydrographers and the difficulty of securing reliable gagekeepers in many localities have contributed to some inaccuracies in the work.

## FIELD METHODS OF MEASURING STREAM FLOW

### BASE DATA

In making plans for power, irrigation, municipal water supply, and other projects involving the use of water from surface streams it is necessary to have data from which both the total flow of the stream and its distribution from day to day throughout the year can be obtained. The data necessary for obtaining such information are daily gage heights, which give the fluctuations of rise and fall of the stream, and measurements of discharge at various stages, from which a rating curve and table can be prepared giving the discharge for any stage. Such a rating is possible from the fact that so long as the conditions at the controlling section in the stream remain the same the discharge will be approximately the same for any given gage height.

Points at which discharge measurements are made and records of daily fluctuations of stage are kept for determining the daily flow, are termed gaging stations.

Gaging stations may be classified as weir stations and velocity-area stations. At weir stations the head of water on the crest of the weir is measured and the discharge computed by means of a formula. The discharge at velocity-area stations is obtained by measuring the velocity of the current and the area of cross section, the product of the two giving the discharge.

The data presented in this paper were collected at both weir and velocity-area stations.

### WEIR MEASUREMENTS

A weir properly constructed and of a type for which accurate coefficients have been determined is one of the most convenient

and reliable means of measuring small quantities of water. In practice, however, weirs rarely conform to the requirements imposed by the experimenter who derived the coefficients. If the crest of the weir is sharp and clean and sufficiently high above the bottom of the leading channel, if the end contractions are complete and the velocity of approach is wanting or negligibly small, and if the head on the crest is measured at a distance back of the overfall at least as great as the length of the weir crest, the Francis formula will give good results. On the other hand, if these essential conditions are not complied with or if the weir is improperly constructed and there is leakage around or under it, and especially if the velocity of approach is considerable and the contractions are imperfect, the Francis formula will not give accurate results.

The type of weir most commonly used in the Philippines is the rectangular sharp-crested with end contractions which offers the most convenient and reliable means of measuring small quantities of water. It is constructed of planks and timbers in small streams, and leakage is prevented by means of sheathing. The crest is made up of planks with the edge chamfered on the downstream side about  $\frac{1}{4}$  inch.

#### VELOCITY-AREA METHOD

The velocity-area method of measurement consists in determining the mean or average velocity of the water passing a given cross-section area. The area of the cross-section at right angles to the direction of flow is ascertained by soundings which are taken at such distances apart as will show the contour of the stream bed. The depths are recorded and also their distances from some arbitrarily chosen initial point on one side of the stream.

The method of making the soundings depends on the size and stage of the stream. On ditches and small streams, where the depths and velocities are not large, a graduated rod may be used; on large streams, which must be measured from bridges or cables, a lead weight and sounding line must be used. The size of weights—whether 10 or 15 pounds—depends on the swiftness of the current; and the weights are torpedo shaped, so as to offer as little resistance as possible to the moving water.

On streams the beds of which are permanent or nearly so a standard cross-section is usually constructed from careful soundings and referred to the zero of the gage, so that the depths for any stage can be found by adding the gage height at that stage to the depths below the zero of the gage. This

method is especially useful at high stages, when it is difficult to make accurate soundings.

After the cross-section area of the stream has been measured by soundings and horizontal distances, the velocity is determined at a number of points. These measurements of velocity should be made at frequent intervals across the stream and close enough to take account of any abrupt change in the velocity. For convenience, the velocities are usually observed in the same verticals at which soundings are made. On some streams fairly good measurements of velocities may be made by means of surface floats. This method is applicable, however, only to channels of uniform cross-section area over a considerable distance, and is not so extensively used on natural streams like those of the Philippines.

The velocity of flow is best determined by the current meter, which is a form of water wheel actuated by the current and of such size and shape that it can easily be placed at any point in the stream.

The penta-recording current meter consists of six cups attached to a vertical shaft which revolves on a conical hardened-steel point when immersed in moving water. The revolutions are indicated electrically or acoustically. The rating, or relation between the velocity of moving water and the revolutions of the wheel, is determined for each meter by drawing it through still water for a given distance at different speeds and noting the number of revolutions for each run. From these data a rating table is prepared which gives the velocity in meters per second of moving water for any number of revolutions in a given time.

Three classes of methods of measuring velocity with current meters are in general use—multiple-point, single-point, and integration.

The two principal multiple-point methods in general use are the vertical velocity curve and 0.2 and 0.8 depth.

In the vertical velocity-curve method a series of velocity determinations are made in each vertical at regular intervals, usually about 10 to 20 per cent of the depth apart. By plotting these velocities as abscissas and their depths as ordinates, and drawing a smooth curve among the resulting points, the vertical velocity curve developed. The curve shows graphically the magnitude and changes in velocity from the surface to the bottom of the stream. The mean velocity in the vertical is then obtained by dividing the area bounded by this velocity curve and its axis by the depth. This method of obtaining the mean

velocity in the vertical is probably the best known, but on account of the length of time required to make a complete measurement its use is largely limited to the determination of coefficients for purposes of comparison.

In the second multiple-point method the meter is held successively at 0.2 and 0.8 depth, and the mean of the velocities at these two points is taken as the mean velocity for that vertical. On the assumption that the vertical velocity curve is a common parabola with horizontal axis, the mean of velocities at 0.22 and 0.79 depth will give closely the mean velocity in the vertical. Actual observations under a wide range of conditions show that this multiple-point method gives very closely the mean velocity of water flowing in open channels and that in a completed measurement it seldom varies as much as 1 per cent from the result obtained by the vertical velocity curve method. It is very extensively used by the United States Geological Survey.

In the single-point method the meter is held either at the depth of the thread of mean velocity or at an arbitrary depth for which the coefficient for reducing to mean velocity has been determined or must be assumed.

Extensive experiments by means of vertical velocity curves show that the thread of mean velocity generally occurs between 0.5 and 0.7 total depth. In general practice the thread of mean velocity is considered to be at 0.6 depth, and at this point the meter is held in most of the measurements made by the single-point method. A large number of vertical velocity curve measurements, taken on many streams and under varying conditions, show that the average coefficient for reducing the velocity obtained at 0.6 depth to mean velocity is practically unity. The variation of the coefficient from unity in individual measurements is, however, greater than in the 0.2 and 0.8 method and the general results are not so satisfactory.

In the other principal single-point method the meter is held near the surface, usually about 0.30 meter below, or low enough to be out of the effect of the wind or other disturbing influences. This is known as the surface method. The coefficient for reducing the velocity taken at the surface to the mean has been found to be in general from about 0.85 to 0.95, depending on the stage, velocity, and channel conditions. The higher the stage the larger the coefficient. This method is especially adapted for flood measurements, or for measurements when the velocity is so great that the meter can not be kept in the correct position for the other methods.

The vertical integration method consists in moving the meter at a slow but uniform speed from the surface to the bottom and back again to the surface and noting the number of revolutions and the time taken in the operation. This method has the advantage that the velocity at each point of the vertical is measured twice. It is useful as check on the point methods. In using the Price meter great care should be taken that the vertical movement of the meter is not rapid enough to vitiate the accuracy of the resulting velocity determination.

In practical work on rough streams, such as many of those in the Philippines, the meter should be held at 0.6 depth if the depth is 0.3 meter or less. If the depth is greater the meter should be held at two points in the vertical, 0.2 and 0.8 from the surface.

When the mean velocities in the different verticals have been found, the average of two adjacent means is taken as the mean velocity for that individual section. The area of the section is computed by multiplying the width of the sections by the mean depth. The discharge of each section is then the product of the area multiplied by the mean velocity, and the total discharge of the stream results from summing up the discharge of the individual sections. In practice the work is tabulated in such a way as to render the computation very simple.

Current meter measurements are not practicable where there are eddies, cross currents, swirls, or passages for the water underneath stones. It is usually possible, however, to improve the channel by removing boulders and rocks, so that a satisfactory measuring section may be obtained, even on rough, steep streams such as exist in the Philippines.

Four kinds of velocity-area gaging stations are in general use in the Philippines, according to the means provided for making the observations of depth and velocity. They are wading, boat, bridge, and cable stations.

A wading station is one at which measurements are made only by wading—that is, no means exist for getting above the water at any stage except by wading. Such stations are usually on ditches or wide, shallow streams, which do not fluctuate greatly. On many streams, however, measurements are made at low stages by wading, even though other means exist for making measurements at higher stages.

A boat station is one at which the measurements are made on a boat (*banca*) or on a sufficiently strong bamboo raft. This kind of station is used on streams where the method by wading



is impracticable or in the absence of already existing highway or railroad bridge and the cost of a cable station would not warrant its establishment.

A bridge station is one at which the meter is used from a bridge. In some places highway or other bridges are available from which to make measurements, but generally they are not at the right place on the stream. Temporary bamboo bridges are then built.

A cable station is one at which measurements are made from a cable spanning the stream. Cable stations are used on large streams, such as Angat in Bulacan, Jalaur in Iloilo, Santa Cruz in Laguna, Pampanga in Nueva Ecija, Agno in Pangasinan, and Tarlac in Tarlac. The cable supports the car from which a man works above the water. Distances are marked off on the cable itself.

A suitable place for a gaging station having been selected, a staff gage is set in the edge of the stream, either vertical or inclined, but graduated into tenths, half-tenths, or hundredths of a meter vertically. The gage is securely fastened to rocks or trees to prevent displacement by floods and is so placed that the zero, or reference datum, is well below extreme low water. The datum is also referred to a permanent bench mark as an additional precaution. An observer is engaged to record the heights of water morning and evening, and the mean of the two readings is used as the mean gage height for the day. Owing to the rapid rise and fall of most of the streams in the Philippines, two gage height readings a day will not as a rule give a true mean for the 24 hours. For this reason, and also owing to the fact that many of the gaging stations are necessarily situated in the mountains at points remote from all habitations and difficult of access, it will be found necessary to use water-stage recorders.

#### DEFINITION OF TERMS

The volume of water flowing in a stream past a given section is usually expressed in various units among which the second-liter is the most commonly used in the Philippines. This term is an abbreviation for liter per second, which is defined as that volume of water flowing in a stream, 1 decimeter wide, 1 decimeter deep, at the rate of 1 decimeter per second. The term second-liter is generally used in connection with irrigation.

The unit of capacity is the hectare-meter, and is equivalent to 10,000 cubic meters. It is a quantity that would cover a

hectare to a depth of 1 meter. The term "hectare-meter" as an absolute quantity, is used in the measurement of storage capacities of reservoirs.

Other units are (1) those which represent a rate of flow, as "second-foot," "gallons per minute," and (2) those which represent the actual quantity of water, as "run-off in inches."

"Second-foot" is an abbreviation for cubic feet per second and is the unit for the rate of discharge of water flowing in a stream 1 square foot in cross-section at the rate of 1 foot per second.

"Gallons per minute" is generally used in connection with pumping and municipal water supply, the United States gallon of 231 cubic inches being the unit of quantity and 1 minute the unit of time.

"Run-off in millimeters" is the depth to which the drainage area would be covered if all the water flowing from it in a given period were conserved and uniformly distributed on the surface. It is used for comparing run-off with rainfall, which is usually expressed in depth in millimeters.

#### CONVENIENT EQUIVALENTS

The following is a list of convenient equivalents for use in hydraulic computations:

- 1 millimeters equals 0.0394 inch.
- 1 centimeter equals 0.394 inch.
- 1 meter equals 1.094 yards; equals 3.281 feet; equals 39.37 inches.
- 1 kilometer equals 0.621 mile; equals 1094 yards; equals 3281 feet.
- 1 square millimeter equals 0.00155 square inch.
- 1 square centimeter equals 0.155 square inch.
- 1 square meter equals 1.196 square yards; equals 10.764 square feet; equals 1,550 square inches.
- 1 square kilometer equals 247.1 acres.
- 1 hectare equals 2.471 acres; equals 11959.6 square yards; equals 107,636.8 square feet.
- 1 liter equals 0.2642 gallon; equals 1 cubic decimeter.
- 1 liter equals 0.0353 cubic foot; equals 61.022 cubic inches.
- 1 liter of water weights 2.2 pounds.
- 1 hectoliter equals 26.42 gallons.
- 1 hectoliter equals 0.181 cubic yard; equals 3.531 cubic feet.
- 1 cubic centimeter equals 0.06102 cubic inch.
- 1 cubic meter equals 264.2 gallons; equals 1,000 liters.
- 1 cubic meter equals 1.308 cubic yards; equals 35.315 cubic feet.
- 1 second liter equals 0.0353 second foot.
- 1 second liter equals 0.2642 gallon per second; equals 15.852 gallons per minute; equals 951.12 gallons per hour; equals 22,826.9 gallons per day.
- \* 1 second liter for one year (365 days) equals 31,536,000 liters.
- 1 cubic meter per second equals 35.315 second feet.

1 cubic meter per minute equals 35.321 cubic feet per minute; equals 0.5886 second foot.

1 cubic meter of water weighs 2,200 pounds.

1 meter per second equals 3.28 feet per second.

1 meter per second equals 2.2304 miles per hour; equals 3.60 kilometers per hour.

1 atmosphere equals 15 pounds per square inch.

1 watt equals 0.7373 foot-pounds per second.

1 watt equals 0.00134 horsepower.

1 kilo-watt equals  $1\frac{1}{2}$  horsepower.

*To calculate water power quickly:*—  $\frac{\text{Sec-lit} \times \text{fall in meters}}{100}$

equals net horsepower on water wheel, realizing 76 per cent of the theoretical power.

#### OFFICE METHODS OF COMPUTING DISCHARGE

At the end of each year the field or base data for current meter gaging stations consisting of daily gage heights, the results of occasional discharge measurements, notes from observers' books and descriptions of conditions of gaging stations, are assembled. The discharge measurements made at different stages of water level from the low to the high water stage are plotted on cross-section paper, with gage heights as ordinates and discharges as abscissas. Through or among the plotted points, a smooth curve is drawn and this defines the discharge rating curve which is generally more or less parabolic in form.

In preparing the rating curves, a careful study of the class of channels which they represent is made and it is here that notes in regard to the various conditions at the time measurements were made, are of great value. In choosing the scale for plotting the curve, the maximum and minimum gage heights and discharges are considered. The size of the curve is such that the discharge can be read from it with a required degree of accuracy. The inclination of the rating curve is approximately  $45^\circ$  with each axis, for when the curve becomes nearly horizontal accurate determination of the discharges from it is more difficult.

As a check on discharge measurements mean velocities and cross-section areas are plotted as abscissas and the gage-readings as ordinates and smooth curves drawn through the plotted points which become the area and velocity curves. These curves are especially valuable in extending discharge rating curves to gage heights for which no data by actual gaging are available. The discharges obtained from the extension of curves are estimated discharges. The fact that the velocity

curve usually approaches a straight line, when plotted on logarithmic cross-section paper, while the area curve may be determined for any gage reading from the standard cross-section of streams means that values derived from these curves may be used in extending discharge rating curves.

From the discharge rating curve, a table is prepared giving values for gage readings from the lowest to the highest known water level with their corresponding discharges. The table is smoothed out by adjusting the first and, sometimes, the second differences, if necessary. The differences between the discharges for successive tenths, half-tenths, or hundredths of gage height are in general either constant or gradually increasing, but never decreasing, and as far as possible should follow some general law.

For every rating table the following assumptions are made for the period of applicability: (a) that the discharge of the stream is the same for the same level of the water, that is, for the same gage reading; (b) that the discharge is a function of and increases gradually with the stage; (c) that the increased and decreased discharge due to change of slope on rising and falling stages is either negligible or compensating.

In the Philippines, the torrential nature of most streams with shifting banks and beds cause frequent changes in the cross-section. As a rule, a new cross-section is taken after each flood and a separate rating curve drawn for each period between floods.

The gage height readings are copied directly from the gage height cards as they are received from the hydrographers to standard forms of daily and monthly discharge table. These gage height readings are the arithmetical means of two readings made daily. The daily discharge corresponding to the daily gage height is taken from the rating table. It is assumed that this discharge is the mean discharge in second-liters for that day.

The mean for each month is the mean of the average daily discharge in second-liters. The maximum and minimum are the respective discharges for those days in the month during which the mean discharge is the greatest or the smallest.

The method of computing float measurements varies with the kind of floats used. For surface floats the following method has been found to give sufficiently accurate results. The cross-section area is taken from the mean of areas computed from one if the formulas described for current meter computations. The arithmetical mean of the time in seconds is taken as the

mean time. The velocity is then the length of the run divided by the mean time. The mean velocity is taken about 0.85 of the surface velocity. The mean velocity multiplied by the mean area gives the discharge.

Sub-surface and rod floats are very seldom used. These floats are intended to measure mean velocities directly. The velocity, however, obtained by means of rod floats is found to be greater than the mean and coefficients less than the unity are used to reduce the same to the mean.

#### EXPLANATION OF TABLES

For each current meter gaging station, the following data are given: Description of station, list of discharge measurements, and tables of daily and monthly discharge.

The description of stations gives information with regards to location referred to the nearest post office, railway station, building and tributary stream; installation of gages, whether vertical, horizontal, or inclined staff; how discharge measurements are made; the character of stream bed and banks, affecting the constancy of the relation of gage heights to discharges; maximum and minimum discharge recorded during period of observation; number of diversions above and below the measuring section affecting the total flow; how diversions are made; purpose of investigation or how water is or is to be utilized and the accuracy of data obtained.

The table of discharge measurements gives the results of actual gagings made during the period of observation, also the date, name of hydrographer, gage height, and discharge in liters per second.

The tables of daily and monthly discharges give the discharges per day corresponding to the observed gage heights as determined from the rating curve, and the maximum, minimum, and mean flow for the month corresponding to the observed highest, lowest, and mean gage heights, respectively.

#### ACCURACY OF FIELD DATA AND COMPUTED RESULTS

The accuracy of stream-flow data depends (1) on permanence of the relation between discharge and stage and (2) on the accuracy of observations of stage, measurements of discharge and interpretation of data.

The accuracy recorded in the station description is based on the accuracy of the rating curve, the reliability of the gage-height record, the range of the fluctuation in stage and knowledge of local conditions. The use of "good," "fair," "poor"

indicates that discharge points plotted are on the curve, close to the curve and widely scattered about the curve, respectively.

#### DIVISION OF WORK

The data pertaining to the years 1908 to 1913 were collected under the supervision of George K. Larrison, Assistant Irrigation Engineer, who was succeeded in the later part of the period by Claude O. Brown and John I. Quinn, office engineers. Field work was accomplished by S. G. Cutler, J. A. Steere, J. G. Beckjord, F. T. James, R. D. Klise, F. T. Ryan, C. E. Parish, W. Demers, J. B. Holt, R. W. Hazen, W. G. Frisbie, H. V. Hall, T. S. Lawrence, H. H. Outlaw, and E. L. Lundgren.

The data from the year 1918 to the first quarter of 1919 were collected under the supervision of Nicanor Cortes, acting chief hydrographer, and those for the remaining period, under Jacinto Gochoco, chief hydrographer, who with the assistance of Luis Novenario, hydrographer, M. Trani, assistant hydrographer, A. de la Cruz, junior draftsman, E. Perez and P. Astilla, hydrographic computers prepared all the data for publication. Field work was accomplished by W. Demers, supervising hydrographer, F. T. Ryan and A. Baldonado, district hydrographers, F. Aquino and J. Roxas, assistant hydrographers, R. Pertierra and J. Alario, junior civil engineers, O. Buena-ventura, assistant topographical draftsman, A. Fegarido, M. Yambao, P. del Castillo, N. Robles, and T. Mendoza, junior hydrographers, and V. Villanueva, B. Ramos, D. Belen, M. Canas, S. Pasion, C. Daquil, C. Flores, P. Feliciano, D. Abenes, B. Callang, hydrographic assistants.

#### ACKNOWLEDGMENT

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## GAGING STATIONS MAINTAINED IN THE PHILIPPINES

The following list comprises the gaging stations that have been maintained in the Philippines by the Irrigation Division, Bureau of Public Works, Manila. The stations are arranged in the correlative alphabetical order of provinces and streams. The dates show the years or parts of years for which records are available. A dash following the date indicates that the station was being maintained to December 31, 1922.

### ABRA PROVINCE, LUZON ISLAND

*Abra River near San Quintin.*—May 6, 1910, to March 31, 1912; January 31, 1919—

### AGUSAN PROVINCE, MINDANAO ISLAND

*Adgawan River near Sagunto.*—February 15, 1921, to March 31, 1922.

*Agusan River near Talacogon.*—February 24, 1921, to March 31, 1922.

*Agusan River near Santa Josefa.*—February 1, 1921, to March 31, 1922.

*Gibung River near Ebro.*—Febrary 19, 1921, to January 20, 1922.

*Simulao River near Libertad.*—February 6, 1921, to March 31, 1922.

*Ujot River near Remedios.*—April 22, 1921, to March 31, 1922.

*Umayan River near Loreto.*—February 11, 1921, to March 31, 1922.

### ALBAY PROVINCE, LUZON ISLAND

*Calacran River near Oas.*—January 5, 1921, to September 9, 1922.

*Nacici River near Ligao.*—January 4, 1921, to November 30, 1921.

*Paulog River near Ligao.*—November 27, 1910, to April 20, 1912; February 10, 1919, to July 15, 1922.

*Polangui River near Polangui.*—February 10, 1911, to April 20, 1912.

*Quinali River near Guinobatan.*—March 24, 1910, to April 20, 1912; February 15, 1919—

*Quinali River near Malinao.*—April 2, 1911, to April 20, 1912; April 1, 1919—

*Quinali River near Polangui.*—August 9, 1910, to April 20, 1912; February 12, 1919—

*San Francisco River near Malinao.*—March 29, 1910, to April 20, 1912; February 22, 1919—

*Tobgon River near Ligao.*—January 22, 1921, to March 31, 1922.

#### ANTIQUE PROVINCE, PANAY ISLAND

*Sibalom River near Sibalom.*—June 1, 1910, to November 8, 1913; August 22, 1918, to July 15, 1922.

*Tipuluan River near Sibalom.*—July 17, 1919—

#### BATAAN PROVINCE, LUZON ISLAND

*Cabayo Canal near Limay.*—May 15, 1922—

*Calaguiman River near Samal.*—December 3, 1917, to May 31, 1919.

*Lamao River near Limay.*—October 5, 1919—

*Orani River near Orani.*—December 12, 1917, to May 31, 1919; August 10, 1920—

*Talisay River near Balanga.*—April 26, 1909, to March 23, 1912; February 10, 1921—

*Talisay River near Pilar.*—June 10, 1917, to July 28, 1919.

#### BATANGAS PROVINCE, LUZON ISLAND

*Pansipit River near Taal.*—August 26, 1910, to August 31, 1911.

*Tubig-ng-bayan Irrigation Canal No. 1 near Rosario.*—November 14, 1922—

#### BOHOL PROVINCE, BOHOL ISLAND

*Bago Seco River near Mabini.*—January 19, 1922, to July 18, 1922.

*Cabatang River near Mabini.*—January 18, 1922, to July 22, 1922.

*Dimiao River near Bilar.*—January 28, 1922, to March 31, 1922.

*Gabayan River near Candijay.*—January 21, 1922, to July 24, 1922.

*Loboc River near Carmen.*—January 26, 1922, to July 15, 1922.

*Loboc River near Loboc.*—January 29, 1922—



## BULACAN PROVINCE, LUZON ISLAND

*Angat River near Norzagaray.*—April 3, 1909, to November 8, 1913; August 9, 1918—

*Angat River near Quingua.*—July 24, 1909, to March 16, 1912.

*Bulo River near San Miguel.*—September 21, 1918, to April 30, 1922.

*Maasim River near San Rafael.*—January 29, 1919—

*Pampanga River near Calumpit.*—May 17, 1910, to March 16, 1912.

*Santa Maria River near Santa Maria.*—October 25, 1919—

## CAGAYAN PROVINCE, LUZON ISLAND

*Pañgul River near Solano.*—December 17, 1921, to December 16, 1922.

## CAMARINES NORTE PROVINCE, LUZON ISLAND

*Alinao River near San Vicente.*—January 1, 1921, to March 31, 1922.

*Bical River near Labo.*—January 1, 1921—

*Daet River near Daet.*—January 1, 1921—

*Labo River near Labo.*—January 1, 1921, to May 31, 1922.

*Matogdon River near Labo.*—January 29, 1921, to August 5, 1922.

*San Vicente River near San Vicente.*—January 1, 1921—

## CAMARINES SUR PROVINCE, LUZON ISLAND

*Anayan River near Pili.*—January 1, 1911, to April 20, 1912; March 6, 1919—

*Barit River near Iriga.*—May 8, 1910, to March 30, 1912; February 27, 1919—

*Bato Lake near Bato.*—August 13, 1910, to April 20, 1912.

*Bicol River near Nabua.*—October 18, 1910, to February 17, 1912.

*Buhi Lake near Buhi.*—August 15, 1910, to April 20, 1912.

*Colasi River near Goa.*—December 10, 1910, to April 20, 1912; March 16, 1919—

*Inarihan River near Calabanga.*—August 21, 1920—

*Lagonoy River near Lagonoy.*—February 1, to April 20, 1912; March 11, 1919, to July 15, 1922.

*Libmanan River near Sipocot.*—January 11 to April 20, 1912; January 12, 1921, to June 18, 1922.

*Pawili River near Pili.*—March 20, 1910, to April 20, 1912; March 7, 1919—

*Rangas River near Goa.*—July 14, 1922—

*Waras River near Bao.*—March 20, 1910, to March 30, 1912;  
November 26, 1919, to May 31, 1922.

#### CAPIZ PROVINCE, PANAY ISLAND

*Aclan River near Malinao.*—September 8, 1919—

*Mambusao River near Mambusao.*—June 15, 1919—

#### CAVITE PROVINCE, LUZON ISLAND

*Biñang River near Carmona.*—September 13, 1919, to March 18, 1922.

*Kay Alemang River near Naic.*—September 29, 1918, to March 31, 1922.

*Lantic Creek near Carmona.*—June 20, 1921, to March 31, 1922.

*Maragundong River near Cay-acle, Maragundong.*—November 8, 1919—

*Maragundong River near Mabacao, Maragundong.*—April 4, 1919—

*Patay-na-Ilat Canal near Carmona.*—June 18, 1921, to March 31, 1922.

*Tatlong Balon River near Naic.*—November 11, 1919, to March 19, 1922.

*Ulong Tubig River near Carmona.*—June 17, 1921, to March 31, 1922.

#### CEBU PROVINCE, CEBU ISLAND

*Mananga River near Talisay.*—January 3, 1922—

*Mantayupan River near Barili.*—June 1, 1921—

#### COTABATO PROVINCE, MINDANAO ISLAND

*Auang River near Auang.*—August 1, 1919, to November 25, 1922.

*Kabakan River near Kabakan.*—August 29, 1919, to August 7, 1921.

*Katingauan River near Bual.*—August 19, 1919, to August 10, 1921.

*Libungan River near Libungan.*—September 28, 1919, to July 16, 1921.

*Maganoy River near Maganoy.*—August 17, 1919, to August 3, 1921.

*Malitibug River near Bao.*—August 25, 1919, to August 3, 1921.

*Nitoan River near Parang.*—August 8, 1919, to September 30, 1921.

*Pulangui River near Kabakan.*—August 30, 1919, to August 4, 1921.

*Salimbao River near Salimbao.*—August 6, 1919, to March 31, 1922.

#### DAVAO PROVINCE, MINDANAO ISLAND

*Talomo River near Davao.*—March 18, 1921—

#### ILOCOS NORTE PROVINCE, LUZON ISLAND

*Abis River near Burgos.*—August 8, 1918, to March 31, 1922.

*Alabaan River near Dingras.*—November 13, 1908, to October 21, 1909; April 7, 1911, to April 6, 1912; August 1, 1918—

*Baruyen River near Bangui.*—April 19, 1911, to March 30, 1912.

*Bilatag River near Pasuquin.*—September 22, 1922—

*Bolo River near Bangui.*—April 18, 1911, to March 31, 1912; August 7, 1918, to March 31, 1922.

*Laoag River near San Miguel.*—February 3, 1910 to April 6, 1912.

*Laoag River near Sarrat.*—January 1, 1921—

*Paoay Canal near Paoay.*—March 28, to December 23, 1920.

*Paoay Lake near Paoay.*—June 2, 1909, to April 11, 1912; May 14, 1919, to December 24, 1920.

*Pinacua-an River near Batac.*—June 4, 1911, to April 6, 1912.

*Salsalomague Ditch near Vintar.*—December 17, 1919—

*Vintar River near Bacarra.*—May 6, 1919, to July 15, 1922.

*Vintar River near Salsalomague, Vintar.*—December 17, 1919—

*Vintar River near Visaya, Vintar.*—March 16, 1910, to April 6, 1912; July 28, 1918—

*Visaya Canal near Vintar.*—April 22, 1919, to February 12, 1922.

#### ILOCOS SUR PROVINCE, LUZON ISLAND

*Balaoeg Canal near Nagbuquel.*—November 17, 1919, to February 25, 1919.

*Bullalaya River near Santa Maria.*—September 13, 1911, to March 30, 1912.

*Casupitan River near Bauguen.*—November 22, 1918—

*Casupitan River near Sta. Lucia.*—February 24, 1922—

*Chico River near Suyo.*—August 15, 1918—

*Langlangca River near Galimuyod.*—October 9, 1919—

*Narracan River near Nagbuquel.*—November 20, 1918, to April 15, 1922.

*Santa Maria River near Sta. Maria.*—January 11, 1921—

*Villavieja River near Sta. Maria.*—July 11, 1921—

## ILOILO PROVINCE, PANAY ISLAND

*Aganao River near San Miguel.*—January 1, 1910 to November 25, 1913; October 1, 1918—

*Jalaur River near Dingle.*—November 1, 1909, to November 20, 1913; October 24, 1918—

*Jaro River near Jaro.*—November 29, 1909, to March 16, 1912.

*Magapa Creek near Janiuay.*—April 1, 1910, to March 31, 1912.

*Salog River near Maasin.*—February 15 to May 31, 1910.

*Sibalom River near Leon.*—February 4, 1910, to March 18, 1912; September 29, 1918—

*Suague River near Pototan.*—October 21, 1908, to November 21, 1913; October 4, 1918—

*Tigom River near Maasin.*—February 15 to June 4, 1910; January 24, 1912, to November 26, 1913; February 3, 1921—

*Tigom River near Santa Barbara.*—December 10, 1909, to November 24, 1913; September 17, 1918—

*Ulian River near Dueñas.*—April 1, 1910, to March 16, 1912; September 18, 1918—

## ISABELA PROVINCE, LUZON ISLAND

*Cagayan River near Echagüe.*—April 16, 1918, to April 30, 1922.

*Ganano River near Angadanan Viejo.*—April 19, 1918, to April 30, 1922.

*Magat River near Santiago.*—October 19, 1920, to April 30, 1922.

*Pinacawan River near San Pablo.*—May 1, 1918, to September 20, 1919.

*Siffu River near Ilagan.*—September 1, 1920—

## LAGUNA PROVINCE, LUZON ISLAND

*Botocan River near Mahayhay.*—April 21, 1920, to March 31, 1922.

*Caliraya River near Pagsanjan.*—November 1, 1911, to November 22, 1913.

*Dayap River near Calauan.*—May 1, 1911, to March 16, 1912.

*Dismo River near Calamba.*—April 6, 1911, to March 19, 1912; January 15, to November 30, 1913.

*Laguna Lake near Los Baños.*—February 1 to March 16, 1912; June 17, 1920—

*Lawa Canal near Calamba.*—March 5, 1911, to March 16, 1912; December 26, 1912 to November 22, 1913; January 17, 1917, to November 2, 1919.

*Lilio River near Lilio*.—February 5, 1911, to March 16, 1912.  
*Mabitac River near Mabitac*.—June 2, 1911, to March 16, 1912.  
*Mayor River near Siniloan*.—June 1, 1911, to March 16, 1912.  
*Oples River near Lilio*.—February 5, 1911, to March 9, 1912.  
*Prinsa Canal near Calamba*.—March 5, 1911, to March 16, 1912; December 26, 1912, to November 15, 1913, January 17, 1917, to January 15, 1920.

*Rio del Pueblo near Siniloan*.—July 2, 1911, to March 16, 1912.

*San Cristobal Canal near Calamba*.—January 3 to November 26, 1913; January 18, 1917, to January 15, 1920.

*San Cristobal River near Calamba*.—May 23, 1911, to March 26, 1912; January 1 to November 26, 1913; January 25, 1917, to June 14, 1919.

*San Juan Creek near Loñgos*.—April 20 to June 28, 1918; January 4 to February 14, 1920; May 8 to August 31, 1921; January 17 to May 31, 1922.

*San Juan River near Calamba*.—February 15, 1911, to March 23, 1912; January 1 to November 22, 1913.

*Santa Cruz Canal near Nagcarlan*.—February 19, 1920—

*Santa Cruz River near Nagcarlan*.—February 19, 1920—

*Santa Rosa River near Calamba*.—March 24 to November 29, 1913.

*Taliabing River near Nagcarlan*.—April 1, 1911, to March 9, 1912.

#### LANAO PROVINCE, MINDANAO ISLAND

*Agus River near Dansalan*.—July 1, 1918, to June 30, 1920.

*Agus River near Momuñgan*.—June 18, 1918—

*Gata River near Tamparan*.—September 24, 1919, to July 8, 1922.

*Iligan River near Iligan*.—December 11, 1919, to August 31, 1921.

*Kapay River near Kapay*.—March 1, 1920, to June 30, 1922.

*Malaig River near Tamparan*.—November 20, 1919, to July 1, 1922.

*Matling River near Malabang*.—February 7, 1920, to August 31, 1921.

*Ramain River near Ramain*.—September 13, 1919, to July 1, 1922.

*Rumayas River near Tamparan*.—January 13, 1920, to July 1, 1922.

*Taraca River near Tamparan*.—September 12, 1919, to July 15, 1922.

## LA UNION PROVINCE, LUZON ISLAND

*Amburayan River near Sudipen.*—January 16, 1910, to March 12, 1912; August 17, 1918—

*Aringay River near Tubao.*—May 20, 1911, to March 19, 1912; April 7, 1919—

*Baroro River near San Gabriel.*—June 23, 1920—

*Casilagan Creek near Naguilian.*—April 18, 1921—

*Cava River near Cava.*—November 23, 1911, to March 18, 1912; March 16 to June 21, 1919.

*Malamec Creek near Naguilian.*—June 21, 1911, to March 18, 1912.

*Maluyo River near Balaoan.*—September 1, 1908, to March 19, 1912; May 24, 1919—

*Maragayap River near Bacnatan.*—June 16, 1908, to December 31, 1909; January 6 to March 21, 1912; August 29, 1919—

*Naguilian River near Naguilian.*—May 22 to September 27, 1911; February 15, 1918, to July 15, 1922.

*Ribsoan River near Naguilian.*—June 18, 1911, to March 18, 1912; February 15, 1918, to June 15, 1919.

*Sapang Creek near Bauang.*—December 24, 1919, to December 31, 1920.

## LEYTE PROVINCE, BILIRAN ISLAND

*Anas River near Naval.*—March 9, 1911, to March 30, 1912.

## LEYTE PROVINCE, LEYTE ISLAND

*Binahaan River near Dagami.*—June 4, 1910, to April 11, 1912; November 18, 1918—

*Daguitan River near Burauen.*—November 1, 1911, to April 11, 1912; October 19, 1920—

*Guinarona River near Dagami.*—November 23, 1918—

*Minusuang River near Calincaguing, Barugo.*—October 6, 1908, to November 6, 1909; April 18, 1910, to April 6, 1912; December 29, 1918—

*Minusuang River near Tunga, Barugo.*—March 20, 1911, to March 23, 1912; October 25, 1920—

*Palo River near Palo.*—June 8, 1921—

*Quilot River near Dagami.*—June 4, 1910, to April 11, 1912; November 17, 1918—

*Tagbanato River near Hilongos.*—January 10, 1911, to April 14, 1912.

## MINDORO PROVINCE, MINDORO ISLAND

*Pulang Tubig River near Calapan.*—February 10, 1918, to December 31, 1920.

## MISAMIS PROVINCE, CAMIGUIN ISLAND

*Tibucas River near Mambajao.*—May 4, 1921—

## MOUNTAIN PROVINCE, LUZON ISLAND

*Agno River near Itogon.*—March 4, 1919—

*Balili River near Trinidad.*—January 1 to May 23, 1921.

*Bued River near Camp One.*—May 1, 1910, to March 25, 1912; December 8, 1918—

*Trinidad Canal No. 1 near Trinidad.*—February 25, 1919, to July 10, 1920.

*Trinidad Canal No. 2 near Trinidad.*—February 25, 1919, to February 28, 1920.

*Trinidad Creek near Trinidad.*—January 13, 1919, to June 30, 1921.

*Wangal Creek near Trinidad.*—January 5, to June 14, 1921.

## OCCIDENTAL NEGROS PROVINCE, NEGROS ISLAND

*Bago River near Bago.*—June 20, 1919—

*Bungahin River near La Castellana.*—June 25, 1919, to July 15, 1922.

*Camansi River near Hinigaran.*—April 15, 1920, to November 9, 1921.

*Guintubhan River near Isabela.*—December 16, 1919, to July 22, 1922.

*Imbang River near Talisay.*—July 4, 1919.

*Mao River near Bago.*—April 27, 1920—

*Malugo River near Saravia.*—May 11, 1920—

*Maragandang River near Bago.*—July 20, 1920, to November 4, 1922.

*Pag-iplan River near Himamaylan.*—June 28, 1919—

*Sicaba River near Manapla.*—November 10, 1919, to July 25, 1922.

## ORIENTAL NEGROS PROVINCE, NEGROS ISLAND

*Bayawan River near Tolong.*—February 8, 1922—

*Cahimaya-an River near Tolong.*—February 7, 1922—

*Mangoto River near Tanjay.*—August 20, 1920—

*Tabuyan River near Tanjay.*—November 27, 1921, to March 4, 1922.

## NUEVA ECIJA PROVINCE, LUZON ISLAND

*Baliuag River near Santo Domingo.*—February 16 to July 28, 1913; September 13, 1918—

*Chico River near Peñaranda.*—May 9, 1919—

*Dibabuyan Creek near Santo Domingo.*—September 12, 1918, to December 31, 1920.

*Minalungao or Sumacbao River near Peñaranda.*—January 1, 1912, to November 8, 1913; September 17, 1918—

*Pampanga River near Cabanatuan.*—September 16, 1918, to August 19, 1919; November 29, 1920—

*Pampanga River near Rizal.*—November 18, 1911, to September 3, 1912; December 16, 1918—

*Pampanga River near Santa Rosa.*—September 24 to December 31, 1909; February 25, 1910, to November 8, 1913.

*Peñaranda River near Peñaranda.*—October 28, 1911, to November 8, 1913; May 11, 1919—

*Rizal Canal near Rizal.*—December 16, 1918—

*Talavera River near San Jose.*—May 17, 1911, to November 15, 1913; September 10, 1918—

*Talavera River near Talavera.*—May 16, 1911, to March 23, 1912; February 11 to November 12, 1913; September 12, 1918—

#### NUEVA VIZCAYA PROVINCE, LUZON ISLAND

*Lamut River near Bagabag.*—July 11, 1920, to April 30, 1922.

*Lanog River near Bagabag.*—July 11, 1920—

*Magat River near Bayombong.*—July 15, 1920, to April 30, 1922.

*Morong Canal near Bagabag.*—August 12, 1920—

#### PAMPANGA PROVINCE, LUZON ISLAND

*Balsik River near Florida Blanca.*—January 1, 1921—

*Gumain River near Florida Blanca.*—November 16, 1910, to November 7, 1913; October 4, 1921—

*Pampanga River near Arayat.*—July 1, 1909, to March 16, 1912.

*Porac River near Florida Blanca.*—November 27, 1910, to November 6, 1913; September 23, 1919—

#### PANGASINAN PROVINCE, LUZON ISLAND

*Agno River near Alcala.*—April 24, 1911, to March 27, 1912.

*Agno River near Bayambang.*—July 3, 1908, to March 27, 1912; October 19, 1919—

*Agno River near San Manuel.*—December 11, 1908, to November 29, 1913; September 1, 1918—

*Agno Chico River near Asingan.*—May 11, 1909, to March 20, 1912; March 1, 1920—

*Banila River near Umingan.*—August 4, 1920—



*Binmatay Ditch near Asingan.*—March 22, 1910, to March 20, 1912.

*Bued River near San Fabian.*—March 7, 1920—

*Caruyungan River near Umingan.*—September 20, 1920, to March 31, 1922.

*Mangabol Swamp near Poponto.*—May 7, 1911, to February 29, 1912.

*Mitura River near Asingan.*—June 19, 1910, to March 20, 1912.

*Pao River near Manaoag.*—October 29, 1920—

*Pila River near Mangatarem.*—July 10, 1919—

*Sobel Ditch near Asingan.*—June 5, 1909, to March 20, 1912.

*Tagumusing River near Binalonan.*—January 1, 1920—

*Tarlac River near Bayambang.*—May 5, 1911, to March 5, 1912.

*Toboy River near Asingan.*—August 21, 1908, to March 20, 1912; January 1, 1920—

*Toboy River near San Manuel.*—January 26, 1922—

#### RIZAL PROVINCE, LUZON ISLAND

*Ampid River near San Mateo.*—November 5, 1918, to April 15, 1922.

*Banaba Creek near San Mateo.*—October 17, 1918, to April 15, 1922.

*Bulao River near Antipolo.*—June 25, 1919, to March 31, 1922.

*Laguna Lake near Binangonan.*—October 13, 1919, to November 15, 1920.

*Manga River near Montalban.*—October 20, 1918, to January 19, 1922.

*Morong River near Morong.*—August 1, 1918, to March 31, 1922.

*Nangca River near San Mateo.*—October 19, 1918, to April 15, 1922.

*Pililla River near Pililla.*—July 24, 1918, to March 31, 1922.

*Sala Bato River near Baras.*—May 11, 1919, to March 12, 1922.

*Tanay Canal near Tanay.*—July 24, 1918, to June 21, 1919.

*Tanay River near Tanay.*—September 5, 1918, to June 21, 1919.

#### TARLAC PROVINCE, LUZON ISLAND

*Camiling River near Camiling.*—February 3, 1918—

*Cutcut River near Capas.*—January 1, 1911, to March 28, 1912; September 25, 1919—

*O'Donnell River near San Miguel.*—January 11, 1910, to December 28, 1911; January 5, 1921—

*O'Donnell River near Capas.*—September 13, 1911, to July 31, 1913.

*Parua River near Bamban.*—December 3, 1910, to March 16, 1912; September 16, 1919—

*Sapang Maragul Creek near Capas.*—January 9, 1919, to March 31, 1922.

*Tarlac River near Tarlac.*—November 11, 1917, to July 6, 1918; September 19, 1919—

#### TAYABAS PROVINCE, LUZON ISLAND

*Agus River near Infanta.*—August 19, 1920—

*Taguan River near Candelaria.*—April 9, 1917 to March 31, 1922.

#### ZAMBALES PROVINCE, LUZON ISLAND

*Mabanban Creek near San Antonio.*—March 9 to June 22, 1919.

*Nagsabaran River near San Marcelino.*—July 11, 1919—

*Payetpet River near Botolan.*—July 6, 1919, to November 6, 1920.

*Santa Fe River near San Marcelino.*—July 9, 1919, to March 31, 1922.

*Toton Lanum River No. 1 and No. 2 near Botolan.*—July 6, 1919, to March 31, 1922.

#### ZAMBOANGA PROVINCE, BASILAN ISLAND

*Balobo River near Lamitan.*—July 28, 1920, to April 1, 1922.

*Gubauan River near Lamitan.*—July 30, 1920—

*Maloso River near Maloso.*—July 24, 1920—

#### ZAMBOANGA PROVINCE, MINDANAO ISLAND

*Ayala River near Ayala.*—February 17 to September 28, 1918; June 4, 1920—

*Bolong River near Zamboanga.*—August 19, 1920—

*Curuan River near Zamboanga.*—July 10, 1920—

*Layawan River near Dipolog.*—November 30, 1920—

*Manikahan River near Zamboanga.*—February 17 to September 21, 1918; June 18, 1920—

*Mercedes River near Zamboanga.*—September 8, 1920—

*Tumaga River near Zamboanga.*—June 9, 1920—

## ABRA PROVINCE

### ABRA RIVER, SAN QUINTIN

**LOCATION.**—About 1 km. east of the barrio of Palang and just north-east of San Quintin, Abra.

**RECORDS AVAILABLE.**—From January 31, 1919, to December 31, 1922. Also there are records from May 6, 1910, to March 31, 1912 at about the same place as the present station.

**GAGE.**—Standard metric gage board of three sections fastened vertically to iron bars imbedded in limestone formation at right bank of river.

**DISCHARGE MEASUREMENTS.**—Made from raft.

**CHANNEL AND BANKS.**—Channel is straight for 500 m. above and for 600 m. below gaging section. Both banks are high, solid, and free from possible erosion. Stream bed of sand, gravel, and mud.

**EXTREMES OF DISCHARGE.**—Maximum discharge recorded during period of observation, 11,555,000 second-liters on September 28, 1911. Minimum discharge, 10,400 second-liters on March 31, and April 13, 24, and 27, 1920.

**DIVERSIONS.**—None.

**REGULATION.**—None.

**UTILIZATION.**—For irrigation purposes.

**ACCURACY.**—Daily discharge from May, 1910, to March, 1912 determined from a poorly defined curve. Daily discharge from February 1, 1919, to December 31, 1922, determined from a fairly well-defined curve. Gage read twice daily.

#### *Discharge measurements Abra River, near San Quintin, Abra*

Date	Made by—	Gage height (meters)	Discharge (second liters)	Remarks
<b>1909</b>				
January 14 . . . . .	F. T. James . . .	1 27	95,900	
January 22. . . . .	do. . . . .	1 20	82,000	
February 5 . . . . .	do. . . . .	1 20	70,400	
February 13. . . . .	do. . . . .	1 10	65,500	
February 19 . . . . .	do. . . . .	1 10	64,700	
March 6 . . . . .	do. . . . .	1 03	66,500	
<b>1910</b>				
April 9 . . . . .	do . . . . .	17 60	53,140	
April 28 . . . . .	do. . . . .	17 75	79,895	
April 29 . . . . .	do. . . . .	17 70	68,840	
May 18. . . . .	do. . . . .	17 79	89,910	
<b>1911</b>				
May 3 . . . . .	do . . . . .	17 92	79,464	
November 11. . . . .	do. . . . .	18 11	178,782	
December 22 . . . . .	do. . . . .	17 89	136,386	
<b>1912</b>				
March 12. . . . .	do . . . . .	17 46	51,549	

*Discharge measurements Abra River, near San Quintin, Abra—Continued*

Date	Made by—	Gage height (meters)	Discharge (second liters)	Remarks
<b>1920</b>				
December 17.. . . .	R. Pertierra and S. Pasion.	1 25	126,330	.....
December 18 .. . . .	do. ....	1 31	128,087	.....
December 19 .. . . .	do. ....	1 27	125,955	.....
December 20 .. . . .	do. ....	1 22	123,850	.....
December 21 .. . . .	do. ....	1 19	102,787	.....
December 21 .. . . .	do. ....	1 11	86,452	.....
December 22 .. . . .	do. ....	1 15	94,225	.....
<b>1921</b>				
February 18 .. . . .	S. Pasion. ....	98	50,615	.....
March 15 .. . . .	do. ....	1 03	62,359	.....
April 20 .. . . .	do. ....	77	34,248	.....
May 2 .. . . .	do. ....	1 03	58,249	.....
December 31 .. . . .	do. ....	2 04	99,752	.....
<b>1922</b>				
January 17 .. . . .	do. ....	1 87	68,876	.....
January 28 .. . . .	do. ....	1 79	53,190	.....
February 20 .. . . .	do. ....	1 70	50,544	.....
March 18 .. . . .	do. ....	1 56	38,675	.....
April 1 .. . . .	do. ....	1 58	43,008	.....
April 15 .. . . .	do. ....	1 50	16,476	.....

NOTE.—Gage height from December 17, 1920, referred to different data.

Daily and monthly discharges, in liters per second, of Abra River near Palang, San Quintin, Ilocos Sur, for the year 1910

Day	January	February	March	April	May	June	July	August	September	October	November	December
1						365,730	219,600	157,500	376,860	195,900	105,900	126,900
2						353,010	173,400	173,400	306,440	195,900	109,200	125,000
3						314,260	241,800	147,900	316,310	227,400	105,900	122,100
4						211,800	279,870	175,200	322,800	215,400	112,200	125,000
5						228,900	232,200	198,900	348,700	227,400	105,900	131,700
6					63,600	165,300	257,700	205,500	1,310,020	224,400	109,200	131,700
7					128,400	191,100	239,000	200,700	863,400	239,200	105,900	125,000
8						195,900	251,000	202,200	958,120	249,600	105,900	122,100
9						215,900	251,000	202,200	958,120	249,600	105,900	122,100
10						183,000	197,400	183,000	489,800	243,640	115,500	117,300
11					112,200	203,000	197,400	179,800	376,860	243,640	115,500	117,300
12					94,800	189,900	189,900	179,800	391,170	230,700	99,600	128,400
13					94,800	179,800	205,500	178,900	348,700	186,300	134,100	134,100
14					99,600	150,900	187,400	178,200	294,180	179,800	134,100	134,100
15					115,500	205,500	213,300	178,200	270,300	173,400	147,900	167,800
16					101,100	213,300	221,700	198,900	262,200	186,300	167,800	167,800
17					86,500	208,500	389,580	208,500	255,900	176,400	165,300	165,300
18					80,400	211,800	350,290	227,400	384,650	186,300	162,000	162,000
19					72,600	207,000	300,540	221,000	411,840	171,900	149,100	149,100
20					63,600	205,500	273,600	215,400	394,350	157,500	237,000	237,000
21					78,900	165,300	228,800	202,200	246,600	160,500	224,400	224,400
22					93,300	210,300	215,400	198,900	246,600	154,200	208,500	208,500
23					72,600	222,900	211,800	221,000	323,700	144,600	239,200	239,200
24					308,490	179,800	203,700	219,800	322,800	138,300	249,600	249,600
25						257,700	198,900	210,000	411,360	133,500	230,400	230,400
26						275,500	186,300	332,800	257,700	105,900	187,200	187,200
27					308,490	219,800	198,900	332,800	224,400	96,300	159,000	159,000
28					195,900	219,800	186,300	586,740	224,400	59,100	149,100	149,100
29					267,000	175,200	157,500	574,020	216,600	88,500	141,300	141,300
30					283,050	194,000	155,700	459,540	96,300	88,500	141,300	141,300
31					210,300	159,000	430,920	430,920	96,300	88,500	141,300	141,300
Maximum.					308,490	365,730	389,580	586,740	1,310,020	443,640	259,200	165,300
Minimum					63,600	150,900	155,700	147,900	96,300	59,100	99,600	117,300
Mean					134,327	216,690	223,799	240,801	370,517	188,643	153,991	138,629

NOTE.—No gage height records for dates in which discharges are not given.

Daily and monthly discharges, in liters per second, of Abra River near Palang, San Quintin, Ilocos Sur, for the year 1911

Day	January	February	March	April	May	June	July	August	September	October	November	December
1						565,000	380,000	8,305,000	4,350,000	4,450,000	360,000	178,200
2						200,600	530,000	8,475,000	3,005,000	4,040,000	330,000	174,000
3					200,600	135,100	645,000	8,475,000	3,005,000	2,960,000	305,000	169,000
4						117,600	475,000	3,455,000	1,200,000	3,330,000	290,000	165,800
5					161,700		475,000	3,635,000	1,225,000	1,900,000	280,000	161,700
6					157,900		655,000	1,910,000	1,190,000	1,535,000	280,000	157,900
7					275,000		500,000	1,810,000	895,000	1,060,000	275,000	157,900
8					1,305,000		455,000	2,060,000	885,000	885,000	260,000	165,800
9					1,142,700	114,200	445,000	3,740,000	1,005,000	795,000	285,000	670,000
10					1,360,000	142,700	540,000	5,320,000	3,740,000	1,150,000	265,000	675,000
11					2,120,000	187,000	425,000	8,390,000	1,105,000	685,000	305,000	605,000
12					1,475,000	270,000	415,000	4,280,000	1,915,000	880,000	300,000	460,000
13					2,410,000	285,000	390,000	5,100,000	1,100,000	880,000	290,000	395,000
14					2,245,000	320,000	685,000	4,445,500	1,015,000	905,000	280,000	365,000
15					1,355,000	305,000	1,540,000	3,815,000	910,000	1,050,000	270,000	340,000
16					870,000	715,000	7,340,000	2,880,000	595,000	945,000	260,000	285,000
17					860,000	375,000	4,555,000	1,525,000	3,755,000	945,000	260,000	285,000
18					865,000	405,000	3,575,000	1,745,000	2,755,000	1,075,000	295,000	260,000
19					775,000	435,000	1,180,000	1,435,000	2,045,000	1,075,000	295,000	240,000
20					700,000	435,000	1,205,000	1,705,000	1,585,000	1,075,000	295,000	230,000
21					680,000	430,000	1,235,000	1,365,000	1,425,000	945,000	225,000	270,100
22					735,000	410,000	2,035,000	1,380,000	1,310,000	850,000	220,100	200,500
23					730,000	385,000	2,265,000	1,210,000	1,065,000	765,000	210,300	191,400
24					805,000	375,000	3,485,000	1,150,000	955,000	635,000	210,300	182,500
25					750,000	515,000	3,355,000	1,825,000	890,000	590,000	205,400	178,200
26					685,000	370,000	2,550,000	7,175,000	850,000	600,000	200,600	174,000
27					675,000	320,000	1,770,000	3,375,000	1,700,000	535,000	195,400	169,900
28					675,000	320,000	1,920,000	1,500,000	1,555,000	535,000	195,400	165,800
29					645,000	350,000	1,920,000	2,305,000	9,425,000	460,000	187,000	161,700
30					645,000	400,000	1,820,000	2,095,000	5,255,000	410,000	182,000	157,900
31					640,000		1,655,000	2,435,000		390,000		157,900
Maximum					2,410,000	715,000	7,340,000	8,475,000	11,555,000	4,450,000	360,000	675,000
Minimum					142,700	114,200	380,000	1,150,000	850,000	450,000	182,000	157,900
Mean					862,997	344,508	1,607,419	3,408,871	2,319,500	1,225,323	254,927	258,571

NOTE.—See footnote, year 1911

Daily and monthly discharges, in liters per second, of Abra River near Palang, San Quintin, Ilocos Sur, for the year 1912

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	154,100	110,900	74,100									
2	157,300	109,600	71,800									
3	178,200	98,800	68,300									
4	178,200	92,800	65,300									
5	174,000	91,800	64,100									
6	174,000	98,000	61,900									
7	174,000	101,200	59,700									
8	174,000	94,800	57,700									
9	165,800	91,800	55,700									
10	161,700	88,800	53,700									
11	157,900	82,800	53,700									
12	154,100	79,800	49,900									
13	150,300	76,900	53,700									
14	150,300	74,100	51,700									
15	142,700	71,300	55,700									
16	135,100	68,800	57,700									
17	128,100		51,700									
18	104,200		51,700									
19	101,200		49,900									
20	98,000		48,100									
21	94,800		46,300									
22	91,800		44,700									
23	91,800		43,100									
24	94,800	88,800	43,100									
25	94,800	85,800	43,100									
26	88,800	82,800	39,900									
27	94,800	82,800	39,900									
28	91,800	79,800	39,900									
29	88,800	76,900	39,900									
30	98,000		38,500									
31	107,600		38,500									
Maximum	178,000	110,900	74,100									
Minimum	88,800	68,800	53,700									
Mean	139,881	87,881	52,703									

NOTE.—See footnote, year 1911.

Daily and monthly discharges, in liters per second, of Abra River near Palang, San Quintin, Abra, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.		194,700	167,100	162,500	176,300	374,100	351,100	1,027,300	1,298,700	222,300	194,700	192,400
2.		194,700	167,100	167,100	180,900	321,200	244,700	967,500	1,103,200	208,500	180,900	169,400
3.		194,700	167,100	167,100	180,900	337,300		1,308,300	475,300	197,000	167,100	163,300
4.		194,700	167,100	160,200	171,700	337,300		1,301,000	486,800	190,100	171,700	144,100
5.		194,700	164,800	157,900	171,700	420,100		1,245,800	466,100	190,100	162,500	122,300
6.		199,300	162,500	153,300	183,200	381,000		1,261,900	493,700	185,500	160,200	101,000
7.		199,300	160,200	153,300	183,200	371,800		2,172,700	461,500	208,500	157,900	95,600
8.		192,400	160,200	153,300	180,900	360,300		3,160,100	381,000	208,500	153,300	95,600
9.		190,100	160,200	157,900	171,700	346,500		2,399,500	318,500	197,000	148,700	135,100
10.		187,800	157,900	169,400	169,400	318,500		1,443,200	309,500	197,000	148,700	135,100
11.		185,500	167,900	157,900	176,300	312,000		1,234,300	318,500	213,100	148,700	135,100
12.		183,200	167,900	169,400	191,100	275,200		1,425,100	300,500	208,500	148,700	135,100
13.		183,200	167,900	169,400	217,700	249,500		1,236,000	335,000	275,200	148,700	135,100
14.		185,500	157,900	180,900	251,400	249,500		1,040,100	335,000	275,200	148,700	135,100
15.		183,200	155,600	171,700	213,100	263,700		985,700	453,800	185,200	137,300	101,000
16.		183,200	155,600	171,700	222,300	263,700		985,700	453,800	185,200	137,300	101,000
17.		176,300	155,600	167,900	187,800	263,700		1,223,700	453,800	185,200	137,300	101,000
18.		171,700	155,600	164,800	194,300	263,700		1,344,700	453,800	185,200	137,300	101,000
19.		171,700	155,600	164,800	194,300	263,700		1,396,700	500,600	489,200	185,200	101,000
20.		174,000	153,300	171,700	212,900	307,100		1,945,000	413,500	420,100	185,200	87,000
21.		174,000	153,300	171,700	212,900	307,100		1,287,200	392,500	351,100	185,200	87,000
22.		174,000	153,300	162,500	243,700	447,700		1,140,000	292,500	259,100	182,900	106,800
23.		171,700	151,000	182,900	238,400	390,200		1,022,700	282,700	236,100	132,900	105,200
24.		169,400	153,300	187,800	226,900	337,300		1,126,500	255,100	206,100	132,900	95,200
25.		169,400	151,000	194,700	292,300	374,100		1,258,000	285,700	285,700	130,700	85,700
26.		164,800	151,000	187,800	247,500	410,900		1,100,100	182,900	282,100	130,700	87,000
27.		167,100	148,700	180,900	275,200	422,400		1,133,900	272,900	298,200	185,500	87,000
28.			148,700	185,500	298,200	360,300		1,034,200	225,900	238,400	263,700	106,800
29.			148,700	183,200	381,000	355,700		1,090,900	176,300	213,100	236,100	102,800
30.			151,000		383,300		1,057,200	1,422,900		194,700		95,200
31.	197,000											
Maximum.	197,000	199,300	167,100	154,700	383,300	450,000	1,057,200	3,160,100	1,298,700	482,200	263,700	192,400
Minimum.	197,000	164,800	148,700	153,300	169,400	293,800	244,700	967,500	132,900	183,200	130,700	87,000
Mean.	197,000	182,543	156,861	171,010	334,023	342,513	611,000	1,350,822	407,843	244,410	154,647	111,268

NOTE.—Daily discharge not very reliable. Data obtained from discharge measurements made only in December, 1920, and made applicable from January 31, 1919. See footnote, year 1911.



*Daily and monthly discharges, in liters per second, of Abra River near Palang, San Quintin, Abra, for the year 1920*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	102,800	72,700	31,000	.....	42,100	102,800	148,700	772,000	475,300	171,700	151,000	126,500
2.....	99,200	47,300	29,800	.....	37,000	82,100	135,100	767,400	668,500	160,200	146,400	118,200
3.....	106,800	44,700	28,600	.....	24,000	75,700	126,500	654,700	1,567,500	229,200	153,300	116,200
4.....	106,800	42,100	27,400	.....	24,000	74,200	171,700	521,300	1,818,500	295,900	148,700	116,200
5.....	114,200	41,800	25,200	.....	25,200	95,300	174,900	489,100	998,700	378,700	171,700	114,200
6.....	110,400	39,600	25,100	14,300	37,400	208,500	162,500	539,000	548,900	259,100	162,500	110,400
7.....	106,600	39,600	25,100	32,200	32,200	197,800	222,300	474,700	548,900	268,300	157,900	106,600
8.....	104,700	37,000	22,900	20,700	32,200	132,900	222,300	466,100	429,300	240,700	182,500	194,700
9.....	99,200	37,000	22,900	20,700	32,200	174,000	231,500	431,600	397,100	222,300	182,500	102,800
10.....	93,800	34,600	21,800	12,500	39,600	167,100	238,400	404,000	385,600	236,100	153,300	118,200
11.....	92,100	33,400	20,700	12,500	47,300	157,900	171,700	424,700	378,700	236,100	153,300	118,200
12.....	93,800	33,400	20,700	12,500	47,300	141,800	171,700	424,700	378,700	226,900	160,200	114,200
13.....	88,700	32,200	20,700	10,400	47,300	122,300	206,200	406,300	367,200	220,000	146,400	114,200
14.....	87,000	32,200	18,500	.....	55,600	114,200	298,200	447,700	332,700	256,800	144,100	114,200
15.....	87,000	31,000	18,500	.....	57,000	126,500	525,900	392,500	332,700	240,700	137,500	114,200
16.....	85,300	31,000	18,500	.....	75,700	126,500	496,000	364,900	330,400	254,500	137,500	116,200
17.....	85,300	25,100	17,400	.....	78,900	162,500	1,344,700	341,900	309,700	222,300	132,900	126,500
18.....	85,300	25,100	17,400	.....	162,500	118,200	2,931,700	374,100	270,600	120,200	132,900	118,200
19.....	82,100	24,000	16,300	.....	231,500	104,700	3,150,200	415,500	240,700	208,500	135,100	110,400
20.....	82,100	24,000	16,300	.....	256,000	99,200	3,299,700	360,300	220,000	199,300	132,900	101,000
21.....	82,100	24,000	16,300	.....	259,100	95,600	3,634,700	369,500	164,800	190,100	132,900	93,800
22.....	82,100	24,000	16,300	.....	244,800	97,800	2,623,500	550,500	139,500	176,300	132,900	95,600
23.....	88,700	20,700	15,300	10,400	137,300	144,100	2,043,900	532,900	113,200	171,700	130,700	98,800
24.....	88,700	20,700	14,300	10,400	112,300	148,700	381,500	500,500	269,700	171,700	126,500	95,600
25.....	80,500	20,700	14,300	16,300	75,700	139,500	1,211,300	505,200	286,700	164,800	126,500	92,100
26.....	80,500	20,700	14,300	10,400	69,700	187,100	1,183,700	452,300	279,800	157,900	124,000	78,900
27.....	78,900	33,400	14,300	37,000	66,800	162,500	1,209,000	447,700	176,300	153,300	122,300	75,700
28.....	78,900	33,400	14,300	37,000	66,800	162,500	928,500	431,600	194,700	148,700	126,500	75,700
29.....	75,700	.....	12,300	59,800	75,700	153,300	875,500	438,500	.....	.....	.....	.....
30.....	75,700	.....	12,300	59,800	108,500	.....	.....	.....	.....	.....	.....	.....
31.....	686,300	.....	10,400	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maximum	686,300	72,700	31,000	72,700	266,000	217,700	3,644,700	772,000	1,818,500	378,700	171,700	194,700
Minimum	75,700	20,700	10,400	10,400	24,000	74,200	126,500	341,900	114,200	148,700	122,300	75,700
Mean	109,019	33,303	19,745	25,027	88,165	131,243	1,033,193	473,716	448,181	209,881	142,667	107,181

NOTE.—Daily discharge not very reliable as data utilized are only derived from measurements made in December.

*Daily and monthly discharges, in liters per second, of Abra River near Talaytay, San Quintin, Abra, for the year 1921*

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Day	January	February	March	April	May	June	July	August	September	October	November	December
1	77,300	55,550	54,550	46,850	33,300	135,950	421,800	221,800	415,000	156,700 { 448,600 }	130,100	158,800
2	80,500	56,550	56,550	44,950	33,000	234,400	255,400	209,200	394,000	478,000	126,400	154,600
3	78,900	54,550	54,550	43,000	33,900	408,700	272,200	230,200	368,000	463,300	122,850	154,600
4	61,550	50,550	53,550	42,100	35,700	376,400	154,600	205,000	373,000	415,000	119,350	160,900
5	61,550	50,550	52,550	39,300	33,900	312,100	150,400	188,200	381,400	391,900	122,850	167,200
6	57,550	52,550	52,550	39,300	33,900	217,600	171,400	196,600	494,800	377,200	122,850	162,000
7	58,550	54,550	54,550	39,300	33,700	190,300	200,800	184,000	494,800	377,200	121,100	142,000
8	56,550	53,550	54,550	39,300	41,150	213,400	181,900	253,300	587,200	310,000	115,950	139,900
9	56,550	56,550	56,550	41,150	53,550	255,400	175,600	293,700	385,600	251,200	156,400	137,900
10	56,550	55,550	56,550	44,950	{ 64,550 134,000 }	263,800	169,300	303,700	352,000	209,200	156,700	135,950
11	56,550	54,550	58,550	45,900	99,650	234,400	158,800	299,500	326,800	196,600	179,800	126,400
12	56,550	54,550	57,550	41,150	109,200	221,800	169,300	291,100	394,000	196,600	289,000	126,400
13	56,550	54,550	56,550	40,200	82,550	221,800	152,500	465,400	580,900	198,700	272,200	128,250
14	56,550	50,550	55,550	39,300	95,100	223,900	150,400	553,600	524,200	200,800	268,000	130,100
15	57,550	52,550	56,550	37,600	101,150	213,400	146,200	536,800	417,700	190,300	251,200	126,400
16	58,550	53,550	54,550	35,700	119,350	192,400	142,000	656,500	452,800	175,600	205,000	122,850
17	60,550	50,550	53,550	35,700	124,600	196,600	150,400	452,800	417,100	173,500	165,100	115,950
18	60,550	52,550	52,550	35,700	144,100	188,200	163,000	759,400	358,300	171,400	163,000	105,950
19	62,550	53,550	52,550	33,900	188,200	179,800	138,200	1,654,000	272,200	158,800	163,000	105,950
20	56,550	53,550	52,550	33,900	289,000	190,300	240,300	1,040,800	221,800	158,800	171,400	98,100
21	55,550	54,550	51,600	32,100	276,400	196,600	274,300	1,259,200	163,000	156,700	165,100	85,250
22	55,550	54,550	50,550	32,100	242,800	160,900	1,070,200	1,635,100	154,600	154,600	168,000	79,950
23	56,550	54,550	50,550	32,100	177,700	175,600	1,162,600	1,141,600	142,000	150,400	158,800	77,450
24	55,550	54,550	49,700	33,900	167,200	238,600	198,700	1,015,600	134,000	150,400	158,800	72,450
25	55,550	54,550	48,750	36,600	134,000	196,600	398,700	1,641,000	122,850	148,300	167,200	73,900
26	54,550	53,550	48,750	38,400	196,600	231,600	431,800	513,700	115,950	134,000	175,600	82,500
27	54,550	53,550	48,750	38,400	150,400	298,600	392,600	459,100	130,100	134,000	207,100	78,700
28	54,550	50,550	47,500	38,400	134,000	165,100	377,200	444,400	122,850	142,000	179,800	90,700
29	54,550	46,850	46,850	35,700	134,000	228,100	263,800	402,400	115,950	137,900	209,800	89,350
30	54,550	46,850	46,850	33,800	130,100	228,100	255,400	408,700	114,250	135,950	171,400	92,200
31	54,550	46,850	46,850	33,800	144,100	247,000	237,000	385,600	..	134,000	..	..
Maximum	80,500	56,550	58,550	46,850	289,000	408,700	1,162,600	1,654,000	587,200	478,000	289,000	167,200
Minimum	53,550	50,550	46,850	32,100	33,000	135,950	142,000	124,000	114,250	134,000	115,950	72,450
Mean	59,165	53,707	52,777	38,512	118,525	222,995	276,942	555,023	319,398	225,000	172,128	116,210

NOTE.—Daily discharge determined from fairly well-defined rating curve applicable from December 31, 1921, to April 1, 1922. But this curve was arbitrarily applied for dates before December 31, 1921, and after April 1, 1922.

*Daily and monthly discharges, in liters per second, of Abra River near Talaytay, San Quintin, Abra, for the year 1922*

Day	January	February	March	April	May	June	July	August	September	October	November	December
	85,250	56,500	45,200	40,250	34,200	52,500	119,350	415,000 (2,170,600) {1,800,600}	192,400	507,400	163,000	126,400
1.....	85,900	56,500	45,200	39,450	33,500	47,850	92,200	158,800	194,500	545,200	158,800	130,100
2.....	82,550	55,500	44,350	38,650	32,800	47,850	158,800	198,700	198,700	452,800	154,600	134,000
3.....	82,550	55,500	44,350	37,300	32,100	79,700	102,700	153,100	213,400	436,000	154,600	146,200
4.....	77,450	54,500	43,500	37,300	32,100	67,650	102,700	153,100	213,400	436,000	154,600	146,200
5.....	77,450	54,500	43,500	37,300	32,100	67,650	102,700	153,100	213,400	436,000	154,600	146,200
6.....	76,200	55,500	42,650	37,300	32,100	198,700	167,200	395,100	280,600	377,200	148,300	148,300
7.....	74,950	54,500	41,850	36,400	37,300	198,700	167,200	395,100	280,600	377,200	148,300	148,300
8.....	73,700	54,500	41,850	36,400	37,300	198,700	167,200	395,100	280,600	377,200	148,300	148,300
9.....	72,450	53,500	41,850	35,650	41,850	65,250	333,100	301,600	234,400	331,000	146,200	134,000
10.....	72,450	53,500	41,850	35,650	41,850	65,250	333,100	301,600	234,400	331,000	146,200	134,000
11.....	73,700	52,500	40,250	34,900	64,100	59,600	177,700	337,300	375,100	305,800	144,100	139,900
12.....	72,450	51,500	40,250	34,200	60,700	54,500	134,000	318,400	356,200	272,200	154,600	142,000
13.....	70,950	51,500	39,450	33,500	54,500	82,550	132,050	301,600	457,000	255,400	146,200	134,000
14.....	69,850	50,550	38,650	33,500	56,500	186,100	121,100	314,200	381,400	242,800	137,900	130,100
15.....	68,650	50,550	38,650	33,500	52,500	193,850	117,650	233,200	490,600	276,400	144,100	126,400
16.....	67,650	50,550	38,650	32,800	54,500	110,850	109,200	305,800	900,100	304,200	152,500	124,600
17.....	66,450	50,550	38,650	32,800	58,550	90,750	105,900	326,800	2,800,600 (2,800,600) {2,800,600}	293,200	175,600	122,850
18.....	65,450	49,650	38,650	32,800	81,250	115,950	196,600	389,800	1,850,600 (1,850,600) {1,850,600}	258,000	160,900	121,100
19.....	67,650	49,650	38,650	33,500	61,700	129,250	192,400	389,800	1,850,600 (1,850,600) {1,850,600}	242,800	150,400	119,350
20.....	67,650	49,650	38,650	33,500	60,700	129,250	192,400	389,800	1,850,600 (1,850,600) {1,850,600}	242,800	150,400	119,350
21.....	65,250	48,750	41,850	34,950	59,600	135,950	297,400	368,800	515,800	231,800	154,600	109,200
22.....	62,950	48,750	43,500	38,650	49,650	255,400	184,000	343,600	486,400	280,600	137,900	105,900
23.....	61,800	48,750	41,850	38,650	46,950	261,700	375,100	310,000	431,800	234,400	134,000	102,700
24.....	60,700	47,850	40,250	35,650	42,650	247,000	343,600	289,000	394,000	213,400	132,050	101,150
25.....	60,700	47,850	40,250	35,650	42,650	247,000	343,600	289,000	394,000	213,400	132,050	101,150
26.....	60,700	46,950	44,350	33,500	43,500	175,800	354,100	265,900	368,800	205,000	137,900	99,650
27.....	59,800	46,950	44,350	33,500	43,500	175,800	354,100	265,900	368,800	196,600	135,950	101,150
28.....	58,550	45,200	43,500	32,800	49,650	115,950	364,600	234,400	368,800	188,200	137,900	126,400
29.....	58,550	45,200	43,500	32,800	49,650	115,950	364,600	234,400	368,800	188,200	137,900	126,400
30.....	57,500	45,200	42,650	32,800	52,500	121,100	242,800	215,500	564,100	179,800	126,400	119,350
31.....	57,500	45,200	42,650	32,800	52,500	121,100	242,800	215,500	564,100	179,800	126,400	119,350
Maximum	85,250	56,500	45,200	40,250	81,250	261,700	387,700	2,170,600	2,800,600	545,200	169,300	150,400
Minimum	57,500	45,200	38,650	32,800	31,400	47,850	92,200	198,700	198,700	167,200	122,850	99,650
Mean	69,148	51,523	41,750	35,527	48,613	121,317	207,044	445,797	621,823	292,039	146,868	126,782

NOTE.—See footnote to daily discharge for 1921.

## AGUSAN PROVINCE

### ADGAWAN RIVER, SIGUNTO

**LOCATION.**—South of Sigunto; about 2½ days trip by “baroto” from Talacogon.

**RECORDS AVAILABLE.**—From February 15, 1921, to March 31, 1922.

**GAGE.**—Standard metric gage board on right bank of the river.

**DISCHARGE MEASUREMENTS.**—Made by wading at low stage and from boat at medium and high stages.

**CHANNEL AND BANKS.**—One channel at all stages; straight for 150 m. above and 200 m. below station, banks low, grassy, and not subject to overflow. Stream bed sandy and gravelly.

**EXTREMES OF DISCHARGE.**—Maximum discharge recorded during period of observation 687,200 second-liters on February 8, 1922; minimum discharge 16,230 second-liters on April 19, 1921.

**DIVERSIONS.**—None.

**REGULATION.**—None.

**UTILIZATION.**—For irrigation purposes.

**ACCURACY.**—Discharge determined from fairly well-defined rating curve below 312,000 second-liters. Gage reads twice daily.

*Discharge measurements of Adgawan River, near Sigunto, Agusan*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1921</b>				
February 15	P. B. A.	3 84	50,550	
February 16	do.	6 33	168,013	
April 1	B. and A.	3 45	27,417	
May 27	Abejero.	3 62	40,240	
May 28	do.	3 46	31,884	
May 30	do.	4 10	74,173	
May 31	do.	4 20	83,542	
July 18	do.	4 80	132,114	
July 18	do.	4 35	94,034	
July 19	do.	4 26	84,878	
July 19	do.	4 13	75,317	
October 26	do.	5 05	146,445	
October 26	do.	5 54	198,319	
October 27	do.	4 66	117,316	
<b>1922</b>				
January 7	do.	4 47	113,578	
January 8	do.	6 24	291,056	
January 10	do.	5 13	170,508	
March 17	do.	4 03	97,986	

Daily and monthly discharges, in liters per second, of Adgawan River near Sigunto, Agusan, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1				29,760	66,200	74,550	82,080	111,650	94,080	154,000	60,680	39,960
2				26,760	43,890	41,400	91,800	66,800	340,000	177,000	95,400	51,720
3				25,320	36,690	86,950	63,800	136,250	101,480	86,000	79,120	45,720
4				24,360	163,800	37,840	98,120	82,080	68,640	75,880	52,560	58,760
5				29,240	50,280	54,240	79,200	56,000	69,880	68,210	59,720	86,000
6				29,240	51,600	52,920	58,840	44,960	76,400	61,160	72,800	90,840
7				28,200	37,260	94,320	45,920	43,200	97,280	72,290	61,160	82,480
8				23,400	27,720	94,320	41,880	56,000	83,560	79,120	60,680	97,040
9				37,260	25,320	46,410	75,700	57,620	68,020	169,400	72,800	43,300
10				64,600	27,720	97,200	43,640	49,560	55,460	130,500	60,680	41,400
11				127,800	27,240	84,150	57,080	65,600	97,280	175,000	66,680	39,960
12				32,360	24,360	154,350	63,800	99,800	82,820	147,000	68,210	39,240
13				24,360	27,240	167,000	51,680	89,520	56,540	88,400	55,160	43,680
14				22,440	32,760	97,280	41,440	63,800	45,920	70,250	51,800	41,040
15				22,440	381,580	366,000	83,060	32,500	92,800	111,000	136,500	44,720
16				18,000	335,440	156,200	89,560	32,800	45,400	299,400	136,500	56,920
17				17,100	180,900	176,400	41,440	34,360	39,280	407,200	58,760	58,760
18				16,230	88,760	58,160	79,900	47,480	67,400	150,400	50,460	69,740
19				20,250	55,620	102,320	51,680	41,880	168,300	134,500	46,400	91,460
20				21,150	45,780	72,360	41,980	59,780	84,200	211,000	45,200	81,920
21				29,240	43,890	205,600	40,140	51,140	114,350	114,350	43,680	58,760
22				27,240	33,460	152,600	34,360	38,420	103,300	155,500	71,270	51,720
23				31,320	29,760	150,200	32,210	40,140	116,500	147,000	99,520	60,200
24				25,320	27,720	116,500	35,530	46,440	83,040	111,100	53,400	62,600
25				24,360	70,350	144,200	83,560	51,680	101,380	172,100	46,000	56,040
26				26,280	37,260	187,260	59,240	50,600	69,740	108,500	52,560	49,200
27				22,650	31,320	159,800	132,220	83,000	83,560	31,460	45,200	62,600
28				20,640	30,840	159,800	132,220	528,000	83,560	80,240	45,200	62,600
29				133,950	113,260	122,500	322,000	322,000	236,500	70,250	42,160	97,040
30												
31												
Maximum				270,160	381,680	360,000	322,000	528,000	340,000	299,400	138,500	97,040
Minimum				16,230	24,360	37,840	32,210	32,800	39,280	61,160	42,160	39,240
Mean				48,616	79,827	111,780	69,476	83,809	76,086	122,611	62,615	60,825



## AGUSAN PROVINCE

## AGUSAN RIVER, TALACOGON

LOCATION.—About 15 m. upstream from Talacogon wharf.

RECORDS AVAILABLE.—From February 24, 1921, to March 31, 1922.

GAGE.—Standard metric gage board vertically fastened to a pier of the wharf on the left side of the river.

DISCHARGE MEASUREMENTS.—Made from boat.

CHANNEL AND BANKS.—One channel at all stages; straight for 300 m. above and below the station; both banks permanent, and high. Stream bed muddy.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 2,080,560 second-liters on March 17, 1921; minimum discharge 199,240 second-liters on April 22, 1921.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Gage read twice daily. Records fair.

*Discharge measurements of Agusan River, near Talacogon, Agusan*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1921</b>				
March 20	B. and A.	10 58	1,849,334	.
May 12	Abejero	5 08	427,136	.
May 13	do.	5 00	317,532	.
August 17	do.	4 26	259,354	.
September 24	do.	4 98	390,764	.
September 26	do.	5.08	415,113	.
November 26	do	4 78	360,066	.

Daily and monthly discharges, in liters per second, of Agusan River near Talacogon, Agusan, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.			874,600	1,131,560	647,480	378,000	448,800	360,080	335,400	544,600	736,640	306,480
2.			792,520	1,038,960	664,520	417,560	555,700	350,480	321,160	565,540	702,320	329,880
3.			779,280	938,840	664,520	437,560	446,540	349,480	339,400	589,480	773,120	310,000
4.			681,880	848,320	670,200	465,060	455,700	372,040	370,780	547,200	689,000	308,200
5.			676,040	760,720	647,480	639,000	432,980	346,560	344,600	544,600	586,800	301,320
6.			716,920	693,560	616,760	404,700	402,620	329,880	552,440	534,200	562,920	306,480
7.			959,280	639,000	576,080	451,100	378,000	320,800	557,680	534,200	542,000	311,800
8.			915,480	592,160	534,200	411,120	362,240	324,400	516,280	529,080	529,080	329,880
9.			1,028,120	544,600	498,680	406,840	368,120	303,040	491,400	592,160	518,840	308,200
10.			1,337,640	513,720	469,820	411,120	350,480	299,600	508,600	565,540	516,280	297,880
11.			1,645,480	474,600	442,020	428,460	333,560	342,720	508,600	639,000	506,120	289,280
12.			1,864,480	439,760	413,260	411,120	360,280	337,240	493,800	556,000	508,600	276,840
13.			1,866,680	406,840	390,180	411,120	344,600	354,400	453,400	544,600	439,820	262,720
14.			2,083,840	376,000	386,060	411,120	331,720	339,080	428,960	532,440	446,540	246,560
15.			2,077,640	350,480	458,000	424,040	319,000	319,000	448,500	557,680	517,220	234,400
16.			2,069,660	293,180	649,520	503,560	338,540	338,540	525,000	589,480	517,220	234,400
17.			2,069,660	263,720	565,540	437,560	339,080	240,480	591,000	589,480	479,200	287,840
18.			2,022,160	246,560	568,160	415,400	342,760	259,440	360,080	534,120	455,700	308,040
19.			1,981,280	222,360	568,160	394,300	331,720	287,560	390,180	539,480	437,500	320,800
20.			1,905,320	213,640	568,160	428,460	310,000	254,600	354,400	647,480	428,460	462,620
21.			1,884,920	199,240	565,540	479,400	292,720	275,840	352,240	581,440	419,720	406,840
22.			1,809,000	202,120	547,200	529,080	275,840	253,000	428,460	683,400	415,400	415,400
23.			1,690,960	223,840	521,400	536,800	256,200	231,360	386,060	560,300	402,620	428,460
24.		555,060	219,400	219,400	518,840	489,000	237,440	225,320	386,060	424,040	331,720	411,120
25.		523,960	219,400	219,400	498,680	489,000	289,280	228,320	386,060	653,160	339,080	398,460
26.		565,540	253,000	253,000	465,060	458,000	282,400	225,320	386,060	787,000	324,400	384,000
27.		581,440	460,300	460,300	432,980	474,600	269,280	226,800	408,980	757,800	346,560	374,000
28.		570,780	570,780	570,780	234,400	484,200	324,400	424,980	734,440	734,440	342,760	396,380
29.			1,369,320	608,480	246,680	460,300	362,240	534,200	513,720	725,680	329,880	386,060
30.			1,286,320		299,600		534,520					366,160
31.			1,178,280									
Maximum.	581,440	2,080,560	1,131,560	639,000	555,700	534,200	557,680	592,160	592,160	787,000	736,640	428,460
Minimum.	523,960	199,240	199,240	234,400	234,400	378,000	237,440	225,320	231,000	424,040	320,800	234,400
Mean.	559,356	1,491,974	474,013	451,061	510,928	451,061	347,566	315,912	433,363	601,104	480,851	332,934

NOTE.—Discharge determined from fairly well-defined rating curve.



Daily and monthly discharges, in liters per second, of Agusan River near Talacogon, Agusan, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.	360,280	1,540,360	944,680									
2.	366,160	1,546,200	860,000									
3.	344,400	1,543,280	860,000									
4.	333,560	1,552,320	710,280									
5.	333,560	1,552,320	693,560									
6.	333,720	1,546,200	653,160									
7.	354,400	1,668,840	614,000									
8.	647,480	1,800,240	565,540									
9.	1,011,840	1,887,840	544,580									
10.	997,240	1,969,600	518,340									
11.	1,189,960	2,038,000	489,680									
12.	1,446,920	2,013,400	769,480									
13.	1,449,840	1,984,200	839,560									
14.	1,455,680	1,946,240	822,740									
15.	1,446,920	1,890,160	897,960									
16.	1,489,480	1,785,200	897,960									
17.	1,581,240	1,686,360	1,017,680									
18.	1,616,280	1,622,120	979,720									
19.	1,651,320	1,546,200	897,960									
20.	1,627,960	1,505,320	851,240									
21.	1,610,440	1,444,000	822,040									
22.	1,636,720	1,379,760	792,840									
23.	1,630,520	1,306,760	740,280									
24.	1,668,840	1,235,680	708,160									
25.	1,657,160	1,105,360	679,400									
26.	1,639,600	1,081,600	773,200									
27.	1,581,240	1,008,920	684,800									
28.	1,552,040		647,480									
29.			573,400									
30.												
31.												
Maximum	1,680,520	2,038,000	1,017,680									
Minimum	331,720	1,008,920	489,680									
Mean	1,217,909	1,609,546	755,489									

NOTE.—See footnote to daily discharge for 1921.

## AGUSAN PROVINCE

## AGUSAN RIVER, SANTA JOSEFA

LOCATION.—In front of "plaza" at Santa Josefa.

RECORDS AVAILABLE.—From February 1, 1921, to March 31, 1922.

GAGE.—Two standard metric gage boards vertically set on the left bank of the river.

DISCHARGE MEASUREMENTS.—Made from boat.

CHANNEL AND BANKS.—One channel at all stages, straight for about 300 m. above and below station; both banks high and covered with vegetation; stream bed sandy and muddy and subject to frequent changes during flood.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 2,457,200 second-liters on January 9, 1922; minimum discharge, 11,774 second-liters on October 31, 1921.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Gage read twice daily. Record good for all stages below 450,000 second-liters; fair for higher stages.

*Discharge measurements of Agusan River, near Santa Josefa, Agusan*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1921</b>				
February 1..	B. and A.	4 34	86,058	...
February 24..	do	5 66	534,591	..
April 9.	do	3 98	55,428	..
June 9.	Abejero	4 38	83,763	..
June 10..	do	4 26	72,860	..
June 10	do	4 87	114,558	..
August 10..	do	3 94	52,300	..
August 11..	do	3 88	46,866	...
August 12..	do	3 82	42,540	..
October 10.	do	4 30	87,397	...
October 11.	do	4 12	72,302	..
December 13 ..	do	3 79	42,841	..
December 14 ..	do	4 18	76,032	..
December 15 ..	do	3 98	58,521	..
<b>1922</b>				
March 1 .. . . .	do.	4 23	80,369	..
March 2 .. . . .	do.	4 37	100,611	..

Daily and monthly discharges, in liters per second, of Agusan River near Santa Josefa, Agusan, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1		77,960	109,600	64,040	132,000	92,680	62,980	65,620	55,500	62,800	14,050	50,120
2		79,240	106,000	67,760	108,880	80,520	74,420	51,240	53,700	72,000	12,018	51,300
3		85,260	91,320	66,520	93,360	76,840	76,500	59,520	53,700	53,500	12,506	48,380
4		79,240	77,960	62,900	4,120	72,840	76,500	57,000	57,300	57,300	14,830	47,220
5		71,560	72,940	58,500	69,040	70,920	76,500	57,000	57,300	54,300	37,230	51,900
6		62,580	80,240	58,500	72,840	82,480	72,340	50,200	57,900	55,500	67,760	50,700
7		63,420	130,280	60,320	70,240	91,320	64,740	50,200	65,280	50,120	75,400	66,520
8		63,420	111,040	56,700	70,280	93,360	89,520	69,380	62,800	57,900	70,920	81,800
9		60,320	91,320	55,500	59,700	80,520	78,780	58,660	59,100	68,380	66,520	69,640
10		59,100	255,200	53,100	62,800	94,040	95,760	53,080	62,800	76,040	61,560	51,300
11		61,560	472,680	52,500	61,560	127,440	90,680	47,400	69,000	65,280	49,540	48,380
12		62,800	Flood	51,900	56,700	140,800	65,620	45,300	63,420	72,200	55,500	46,060
13		72,840	471,200	50,700	56,700	155,780	71,300	43,200	53,100	64,040	51,300	48,380
14		67,760	320,600	49,540	72,840	172,200	74,420	41,130	47,220	71,560	51,300	48,380
15		62,800	228,680	49,540	87,240	207,000	91,920	39,120	56,100	62,800	36,600	65,280
16		78,600	199,800	47,220	101,680	195,000	83,400	37,860	47,220	62,800	73,480	73,480
17		89,280	127,440	47,220	135,800	183,300	83,400	37,860	47,220	62,800	92,480	69,000
18		75,400	109,600	46,540	156,220	131,800	83,400	39,120	46,060	67,760	66,520	78,040
19		72,200	111,040	50,700	156,220	131,800	70,340	39,120	27,170	62,800	58,500	87,240
20		68,520	101,680	50,700	142,200	142,600	57,800	39,120	51,300	60,940	54,300	106,720
21		76,580	113,200	47,220	116,800	101,200	54,600	40,440	50,120	64,040	55,500	91,320
22		71,560	103,840	49,540	103,840	85,300	50,200	43,200	46,060	65,900	51,900	76,680
23		72,840	92,680	50,700	84,520	93,160	48,100	46,060	42,510	106,720	53,100	76,680
24		72,200	84,520	66,520	78,600	85,800	44,600	46,060	41,130	434,660	50,700	69,000
25		95,400	80,520	62,800	67,760	91,920	53,080	46,060	39,120	246,400	48,380	65,280
26		118,320	78,600	141,400	60,320	89,440	55,200	45,480	60,700	281,000	50,120	59,100
27		103,120	83,160	Flood	62,800	94,400	57,800	47,220	59,700	94,040	64,040	60,320
28			77,960	410,520	72,200	82,200	82,200	77,960	57,900	65,280	52,500	62,800
29			74,760	149,480	121,360	66,430	82,200	67,300	51,560	95,200	54,300	53,100
30					113,200		82,200	57,300	80,520	11,774		51,300
31												
Maximum		118,320	472,680	410,520	190,220	207,000	95,760	77,960	80,520	434,660	82,480	106,720
Minimum		59,100	67,760	46,540	56,700	68,420	44,600	37,860	27,170	11,774	12,018	46,060
Mean		74,750	141,647	73,285	91,248	111,388	70,279	50,485	53,552	87,905	51,500	63,737



## AGUSAN PROVINCE

## GIBUNG RIVER, EBRO

LOCATION.—About 8 m. downstream from the wharf at Ebro.

RECORDS AVAILABLE.—From February 19, 1921, to January 20, 1922.

GAGE.—Standard metric gage board vertically set on the right bank of the river.

DISCHARGE MEASUREMENTS.—Made from boat.

CHANNEL AND BANKS.—One channel at all stages; straight for 50 m. above and 100 m. below the station. Stream bed sandy and muddy. Both banks high and covered with vegetation.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 88,920 second-liters on September 2, 1921; minimum discharge, 3,280 second-liters on August 10, 1921.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Gage read twice daily; rating curve well-defined below 80,000 second-liters; fair for higher stages.

*Discharge measurements of Gibung River, near Ebro, Agusan*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1921</b>				
February 20. . . . .	B. and A. .	4 51	38,233	
February 21. . . . .	do.	4 68	36,068	
March 25 . . . . .	do	4 46	35,525	
March 26 . . . . .	do	4 21	32 540	
March 27 . . . . .	do	4 06	29,403	
March 27 . . . . .	do	3 97	28,703	
March 28 . . . . .	do	3 80	23,626	
May 19 . . . . .	Abejero.	4 94	39,765	
May 19. . . . .	do	3 12	46,214	
May 20. . . . .	do	4 36	31,411	
May 21. . . . .	do.	3 88	25,674	
May 22. . . . .	do	3 58	22,852	
May 23. . . . .	do	3 25	18,712	
July 24 . . . . .	do	2 72	14,071	
July 25 . . . . .	do	2 86	16,396	
November 1. . . . .	do.	4 58	35,846	
November 1. . . . .	do	4 44	31,210	
November 2. . . . .	do.	4 24	27,906	
<b>1922</b>				
January 19. . . . .	do.	6 89	88,499	
January 20. . . . .	do.	6 81	84,248	

Daily and monthly discharges, in liters per second, of Gibung River near Ebro, Agusan, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.			54,396	20,540	51,120	36,420	23,316	10,248	83,304	20,664	37,380	27,512
2.			60,816	20,512	36,740	25,672	23,572	14,436	88,920	18,130	36,420	26,380
3.			56,248	19,300	28,808	25,020	21,284	11,808	80,600	14,870	68,380	34,732
4.			60,154	17,898	27,080	23,444	16,868	9,728	78,104	12,744	63,796	42,564
5.			60,734	17,782	22,804	20,540	16,532	7,856	61,028	16,980	61,492	42,892
6.			53,456	17,208	25,382	17,094	16,868	9,728	60,590	10,768	59,968	43,068
7.			47,670	19,360	21,564	20,436	14,544	13,472	55,020	10,352	57,736	43,224
8.			47,670	19,360	21,564	20,436	14,544	13,472	55,020	10,352	57,736	43,224
9.			81,224	16,084	13,368	19,920	27,042	3,280	27,042	22,606	32,376	28,660
10.			86,424	16,644	15,420	18,828	27,042	3,280	27,042	22,606	32,376	28,660
11.			86,840	15,420	16,084	19,548	16,308	9,936	23,288	21,524	49,912	23,316
12.			86,008	14,980	16,756	15,640	17,782	15,860	21,288	29,528	46,920	18,130
13.			85,384	13,368	16,980	20,292	38,660	19,300	18,828	34,732	43,224	18,680
14.			79,976	12,120	18,014	26,800	38,340	19,796	18,130	40,900	42,892	15,200
15.			75,400	11,392	41,896	20,664	40,740	13,472	17,094	28,376	43,224	17,094
16.			75,192	10,976	56,620	18,828	40,420	10,248	16,756	24,756	60,724	14,544
17.			76,440	10,456	62,068	18,828	33,442	9,728	16,084	35,780	60,724	32,980
18.			79,560	9,936	57,922	15,530	26,800	4,528	10,144	47,260	60,532	47,952
19.	37,060		78,520	10,352	46,240	14,112	22,676	10,560	16,644	45,900	60,724	52,394
20.	38,660		63,220	11,392	31,292	16,420	20,540	16,980	15,530	50,240	51,120	69,180
21.	38,340		61,292	10,144	26,520	18,946	17,666	21,908	14,760	42,726	39,620	71,666
22.	35,780		54,396	10,248	36,900	16,308	15,200	20,044	13,896	34,732	31,440	66,180
23.	37,060		42,892	10,664	17,898	21,036	13,680	20,912	20,044	28,808	31,440	55,504
24.	35,460		40,260	16,420	16,980	50,416	12,848	14,544	27,368	66,180	28,620	52,030
25.	38,220		35,144	32,980	15,310	52,758	14,112	12,016	26,660	72,280	23,572	51,120
26.	37,700		31,788	36,420	22,548	52,940	12,016	12,224	25,972	73,112	20,912	28,088
27.	38,560		28,808	19,424	22,548	22,676	10,976	12,848	26,108	68,580	32,376	26,244
28.	37,700		26,160	20,064	16,532	25,972	10,768	13,576	20,292	60,340	59,210	26,800
29.			22,548	35,200	16,532	25,972	11,600	13,576	17,208	47,090	43,566	50,416
30.			22,548	61,180	35,200	24,888	12,224	33,528	25,156	47,776	35,460	36,100
31.			21,036	..	35,144	24,888	10,456	71,448	..	62,604	..	29,096
Maximum	38,980	38,980	86,840	65,380	62,068	52,940	40,740	73,528	88,920	73,112	68,380	71,666
Minimum	35,460	35,460	21,036	9,936	13,264	14,112	10,456	3,280	10,144	10,352	20,912	12,680
Mean	37,556	37,556	57,467	20,780	27,482	24,336	20,316	17,981	31,416	36,460	46,268	35,583

## AGUSAN PROVINCE

## SIMULAO RIVER, LIBERTAD

LOCATION.—About the north end of Libertad.

RECORDS AVAILABLE.—From February 6, 1921, to March 31, 1922.

GAGE.—Two inclined standard metric gage boards set on the left bank of the river.

DISCHARGE MEASUREMENTS.—Made from boat.

CHANNEL AND BANKS.—One channel at all stages; straight for 100 m. above and 50 m. below the station, stream bed sandy and gravelly. Both banks low and subject to overflow at extreme high flood. Right bank is covered with vegetation and near left bank is the settlement of Libertad.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 589,200 second-liters on February 8, 1922; minimum discharge, 5,700 second-liters on July 25, 1921.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Gage read twice daily. Records good below 100,000 second-liters, fair for higher stages; discharge below 12,000 second-liters may be in error.

*Discharge measurements of Simulao River, near Libertad, Agusan*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1921</b>				
February 6.	B. and A	3 70	42,182	
April 13	do.	3 36	26,030	
April 14.	do.	3 32	23,166	
April 15	do.	3 26	22,018	
June 14	Abejero	3 06	21,727	
June 15.	do.	4 49	71,983	
August 5.	do.	3 34	22,849	
October 5	do.	3 44	31,914	
October 6	do.	3 56	35,016	
December 7	do.	3 98	52,258	
December 7	do.	3 85	46,242	
December 8	do.	3 66	39,224	
<b>1922</b>				
February 25.	do	4 48	62,087	
February 26.	do	4 32	54,748	

Daily and monthly discharges, in liters per second, of Simulao River near Libertad, Agusan, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	.....	.....	176,310	58,440	85,230	72,400	19,780	20,684	26,000	64,660	46,700	28,608
2	.....	.....	128,470	50,480	61,880	89,270	18,496	19,780	22,100	90,160	69,620	32,600
3	.....	.....	117,810	40,400	52,960	82,010	16,232	19,132	19,132	51,518	107,600	41,858
4	.....	.....	93,310	47,620	49,260	33,100	19,132	22,958	17,864	35,600	79,290	39,940
5	.....	.....	113,310	38,020	43,200	93,180	16,380	26,258	31,980	32,584	51,172	79,340
6	.....	.....	213,310	38,020	43,200	93,180	16,380	26,258	31,980	32,584	51,172	79,340
7	.....	.....	203,150	43,200	31,140	27,300	16,296	19,132	33,998	32,584	78,900	59,100
8	.....	.....	169,410	33,380	32,620	24,340	15,720	24,620	29,788	96,890	78,900	59,100
9	.....	.....	159,290	47,210	32,620	22,120	14,800	19,348	21,862	43,836	69,100	43,836
10	.....	.....	251,750	44,000	25,820	19,950	16,488	25,724	23,076	41,472	69,100	32,920
11	.....	.....	353,410	38,020	29,580	18,510	15,780	18,916	26,864	41,472	42,244	39,492
12	.....	.....	341,910	30,340	25,080	16,350	34,912	20,884	20,884	47,128	43,836	25,172
13	.....	.....	328,450	26,190	26,560	14,910	19,348	20,884	18,496	32,280	44,640	32,688
14	.....	.....	270,150	23,970	25,820	13,830	25,172	24,100	16,488	31,644	22,588	36,300
15	.....	.....	228,750	22,440	42,000	88,910	24,100	16,104	16,104	31,012	28,084	27,782
16	.....	.....	196,550	21,030	44,400	33,560	26,864	15,912	12,728	29,196	135,000	28,084
17	.....	.....	162,050	19,950	46,800	41,472	25,724	15,536	14,272	27,732	78,040	94,160
18	.....	.....	157,450	18,510	35,290	28,608	19,348	14,272	14,624	26,238	43,032	118,000
19	.....	.....	131,690	77,780	27,300	26,258	15,168	13,232	26,864	23,580	35,250	243,400
20	.....	.....	110,990	16,350	24,340	23,076	11,000	14,448	22,148	23,580	32,600	201,600
21	.....	.....	64,460	15,630	22,120	21,862	10,700	13,576	24,100	22,100	32,600	118,760
22	.....	.....	59,300	19,950	19,950	20,684	10,100	18,916	19,348	20,332	30,084	57,140
23	.....	.....	58,440	24,710	17,790	21,356	9,500	18,916	19,348	313,000	71,300	55,230
24	.....	.....	80,170	24,340	16,350	21,148	5,800	17,080	17,680	386,000	73,040	47,984
25	.....	.....	83,510	25,350	15,270	20,950	5,800	16,720	14,624	145,000	87,720	42,630
26	.....	.....	135,510	25,350	15,270	20,950	35,738	16,356	69,696	145,000	84,696	38,400
27	.....	.....	121,910	105,470	13,720	19,348	26,258	15,912	69,696	165,000	165,000	105,286
28	.....	.....	91,850	204,590	12,390	20,684	26,258	20,332	111,160	67,100	87,720	73,040
29	.....	.....	61,880	204,590	14,190	25,448	23,580	40,320	60,100	47,128	87,720	73,040
30	.....	.....	78,790	132,150	15,270	22,344	23,076	43,836	237,500	62,100	81,644	59,100
31	.....	.....	74,200	.....	17,470	.....	21,624	30,696	.....	63,100	.....	77,100
Maximum	.....	.....	353,410	242,590	85,230	88,910	34,912	43,836	237,500	386,000	135,000	243,400
Minimum	.....	.....	58,440	15,630	12,390	13,830	18,916	13,232	12,728	68,371	22,588	22,588
Mean	.....	.....	155,398	55,949	29,564	31,013	19,058	20,351	34,097	68,371	55,612	64,413



## AGUSAN PROVINCE

## UMAYAN RIVER, LORETO

LOCATION.—About 100 m. upstream from the wharf at Loreto.

RECORDS AVAILABLE.—From February 11, 1921, to March 31, 1922.

GAGE.—Standard metric gage board vertically set on the right bank of the river.

DISCHARGE MEASUREMENTS.—Made by wading at low water and from boat at high stage at 50 m. above gaging section.

CHANNEL AND BANKS.—One channel at all stages; straight for 150 m. above and 100 m. below gage. Stream bed sandy and gravelly. Both banks high, composed of alluvial soil and covered with cultivated plants.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 460,320 second-liters on January 9, 1922; minimum discharge, 11,280 second-liters on April 19, 1921.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Gage read twice daily. Record good below 163,000 second-liters. For higher stages records may be in error due to drifts which sometimes dammed up the water.

*Discharge measurements of Umayan River, near Loreto, Agusan*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1921</b>				
February 12	P. B. A	2 71	26,845	
April 4	B. and A	2 62	21,486	
June 3	Abejero	3 48	70,233	
June 4	do.	3 90	92,460	
July 29	do.	3 76	97,636	
July 29	do.	3 34	64,598	
July 30	do.	3 50	77,407	
October 21.	do.	4 48	138,763	
October 21	do.	4 03	100,629	
December 21	do.	2 88	31,886	
December 23	do.	2 69	25,174	
December 24	do.	3 37	63,177	
December 25	do.	2 94	33,722	
December 26	do.	2 74	28,304	
<b>1922</b>				
March 11	do.	2 66	22,157	
March 12	do.	6 14	300,584	

Daily and monthly discharges, in liters per second, of Umayan River near Poblacion, Loreto, Agusan, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1			138,140	24,840	245,700	20,900	55,120	69,900	246,000	55,500	39,360	18,660
2			165,740	25,380	147,500	15,420	62,420	94,540	104,200	236,920	195,280	28,320
3			166,560	24,840	47,000	63,100	51,340	37,520	102,520	98,400	34,400	27,980
4			61,740	24,840	43,400	89,700	56,400	35,780	52,340	56,660	31,076	30,032
5			88,120	24,840	41,600	56,400	61,740	32,400	48,700	45,300	32,150	78,100
6			107,560	23,780	39,260	48,240	60,380	30,240	71,360	38,080	38,680	38,080
7			72,980	23,260	38,100	63,100	34,640	29,160	86,780	59,580	31,788	74,000
8			54,480	22,740	36,340	112,840	30,780	25,380	86,780	34,020	26,640	40,220
9			132,620	22,220	35,780	101,100	113,700	34,640	68,408	229,800	51,240	31,788
10			381,940	21,700	34,840	76,860	38,100	44,600	45,300	229,800	39,790	27,680
11		46,400	368,140	20,700	34,840	88,900	32,400	32,400	34,020	61,350	36,400	23,800
12		31,860	197,900	19,700	34,840	99,460	47,000	32,960	31,160	166,700	31,050	21,416
13		23,780	184,140	18,720	32,400	166,600	34,840	35,200	29,000	82,340	27,640	21,528
14		28,080	309,260	16,380	32,400	166,600	34,840	35,200	29,000	82,340	27,640	21,528
15		16,800	324,140	15,880	32,400	197,340	102,040	19,700	63,750	88,300	25,036	25,560
16		200,140	154,700	15,880	285,340	126,180	105,200	14,500	63,750	125,860	114,700	31,788
17		119,860	149,180	14,040	290,860	89,700	71,540	13,560	123,980	204,900	57,240	133,840
18		102,740	112,840	31,120	272,460	94,540	64,550	15,880	123,980	131,800	42,460	78,100
19		70,820	95,360	11,256	241,180	116,340	48,860	59,200	125,860	356,600	31,788	76,720
20		64,500	87,340	46,600	212,260	118,980	47,620	22,740	60,170	187,440	27,640	53,340
21		55,120	70,820	24,840	196,100	104,380	39,260	47,620	92,450	111,100	25,650	31,788
22		52,100	88,120	21,200	159,300	64,500	33,520	32,400	92,920	76,720	44,340	29,000
23		62,420	62,420	33,520	118,100	150,100	36,460	28,080	95,280	90,300	25,036	35,600
24		61,380	53,340	33,520	39,460	251,300	23,780	32,400	53,880	112,900	29,000	37,240
25		219,100	53,340	33,520	83,440	244,860	19,200	40,420	118,340	177,400	31,788	32,880
26		156,540	51,340	27,540	63,100	126,180	38,100	37,520	97,620	68,700	29,000	27,640
27		171,260	48,560	45,200	45,200	71,740	64,500	138,560	105,880	46,260	22,900	38,560
28		83,440	38,560	18,140	47,620	47,620	55,100	437,920	102,520	20,836	21,416	52,280
29		30,240	30,240	290,860	31,860	65,200	56,400	114,700	104,200	34,800	19,984	41,560
30			26,160	24,840	24,840	89,840	39,840	160,640	30,032			33,640
31			381,940	340,540	290,860	251,300	113,700	437,920	240,000	356,600	195,280	133,840
Maximum		278,900	381,940	340,540	290,860	251,300	113,700	437,920	240,000	356,600	195,280	133,840
Minimum		16,800	26,460	11,280	24,840	15,420	19,200	13,560	29,000	20,836	19,984	18,660
Mean		102,875	134,010	45,672	97,504	105,789	52,083	58,981	82,434	106,261	41,705	41,075

Daily and monthly discharges, in liters per second, of Unagan River near Poblacion, Loreto, Agusan, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	42,450	190,000	31,788									
2	32,880	163,520	30,376									
3	29,000	112,900	27,540									
4	27,640	100,840	21,112									
5	35,600	72,680	23,800									
6	42,000	87,540	22,600									
7	23,500	146,420	29,688									
8	123,040	331,120	33,260									
9	460,320	368,880	22,600									
10	123,980	317,400	23,500									
11	58,980	94,460	30,376									
12	61,240	83,780	311,880									
13	46,260	75,560	368,880									
14	44,340	65,158	86,670									
15	203,500	56,080	38,500									
16	195,280	53,880	91,380									
17	107,560	40,220	51,240									
18	130,800	38,500	42,450									
19	122,100	34,800	47,700									
20	64,350	45,300	38,080									
21	92,920	80,900	29,688									
22	178,560	52,800	23,200									
23	340,920	40,220	34,800									
24	116,500	33,260	29,688									
25	62,550	28,320	27,300									
26	109,300	28,320	25,650									
27	137,940	27,640	21,416									
28	335,260	19,700	19,700									
29	225,300	18,920	18,920									
30	122,100	16,920	16,920									
31	460,320	368,880	368,880									
Maximum	23,500	27,640	18,920									
Minimum	116,602	101,388	54,791									
Mean												

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## ALBAY PROVINCE

### CALACRAN RIVER, OAS

**LOCATION.**—About 2 km. in the easterly direction from the Oas-Manga trail.

**RECORDS AVAILABLE.**—From January 5, 1921, to September 9, 1922.

**GAGE.**—Standard metric gageboard vertically fastened to a tree on the left bank of the river.

**DISCHARGE MEASUREMENTS.**—Made by wading.

**CHANNEL AND BANKS.**—One channel at all stages; straight for about 60 m. above and below the stations; stream bed sandy and muddy. Both banks high of earthy texture and covered with vegetation.

**EXTREME OF DISCHARGE.**—Maximum discharge recorded during period of observation, 77,230 second-liters on August 1, 1922; minimum discharge, 304 second-liters on June 13, 1922.

**DIVERSIONS.**—None.

**REGULATION.**—None.

**UTILIZATION.**—For irrigation purposes.

**ACCURACY.**—Gage read twice daily. Records determined from poorly-defined curves.

#### *Discharge measurements of Calacran River, near Sabang, Oas, Albay*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1921</b>				
January 5..	S. Musa .	.65	1,558	
May 19 .	do.	.45	1,316	
August 5.	Buchanan and Musa.	.95	4,387	
September 2	S. Musa .	1 15	8,067	
December 10	O. Bueraventura	1 05	4,849	
December 24	do.	.94	3,865	
<b>1922</b>				
January 2 .	S. Musa..	.96	3,268	
January 24 .	do.	.86	2,393	
January 25 .	do.	.85	2,156	
March 6 .	do.	.70	873	
March 7 .	O. Bueraventura	.68	806	
March 23 .	S. Musa .	.42	801	
April 4 .	O. Bueraventura	.40	671	
April 20 .	do.	.40	697	
May 3..	do.	.42	848	
May 24 .	do.	.50	1,391	
June 4 .	do.	.39	490	
June 20..	do.	.42	669	

Daily and monthly discharges, in liters per second, of Calacran River near Sabang, Oas, Alboj, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.		2,720	1,970	2,370	640	1,615	2,210	3,880	17,810	6,025	8,100	8,980
2.		2,050	1,895	2,050	820	1,485	2,370	3,110	6,145	17,560	15,140	7,440
3.		1,750	1,365	1,615	1,365	1,020	4,000	2,910	7,140	3,835	42,420	7,220
4.		2,050	2,210	1,365	730	920	51,810	3,315	17,250	3,570	42,200	6,800
5.	1,365	2,540	8,850	1,820	550	820	40,210	4,000	15,330	6,025	41,100	14,040
6.	1,750	38,810	25,650	1,750	820	820	10,810	3,760	17,250	3,970	39,780	12,500
7.	1,615	17,810	65,410	1,485	1,365	1,615	8,065	4,260	18,370	7,440	42,640	7,220
8.	2,540	4,000	33,210	1,750	1,505	2,210	4,825	3,420	16,970	9,860	34,500	6,925
9.	1,245	3,530	22,850	1,550	1,485	2,540	4,825	17,810	18,930	17,560	34,060	3,760
10.	1,750	2,910	5,450	1,485	1,425	2,540	12,210	18,370	18,930	17,560	63,590	3,835
11.	1,750	2,050	3,880	1,130	1,485	2,910	4,530	18,930	31,520	18,370	66,180	3,835
12.	1,245	1,750	2,050	1,365	1,365	2,910	4,530	18,370	41,760	12,940	66,180	3,570
13.	2,720	2,365	2,910	1,365	505	2,370	2,810	16,410	45,500	14,480	63,100	7,560
14.	2,365	1,365	3,110	1,365	335	3,530	2,370	4,825	30,760	13,380	34,500	8,980
15.	4,390	1,750	3,315	820	820	4,000	2,370	4,130	26,960	12,940	13,820	8,540
16.	3,010	2,720	3,210	820	1,365	2,540	3,110	4,260	13,160	10,300	17,440	7,880
17.	1,895	2,050	3,110	1,365	820	2,810	4,260	2,910	3,970	3,835	8,100	7,000
18.	1,550	1,750	4,260	1,365	820	2,540	3,110	4,530	3,075	3,835	6,400	5,670
19.	1,895	2,720	2,720	820	1,365	2,210	8,850	3,315	2,960	2,615	5,335	4,396
20.	1,550	4,720	2,810	1,020	1,730	2,370	20,810	2,720	18,020	2,615	6,385	4,396
21.	1,615	52,810	2,210	820	1,750	2,050	5,790	2,910	16,020	2,615	10,800	4,700
22.	2,050	17,810	2,630	940	1,365	1,615	5,130	2,810	11,620	2,565	17,700	4,110
23.	2,720	32,810	2,540	820	820	2,910	5,130	2,720	31,420	1,980	27,460	4,700
24.	1,895	37,810	3,110	990	1,615	2,455	6,325	3,420	13,820	2,615	45,060	6,025
25.	1,365	17,130	3,110	820	1,365	1,970	6,145	2,910	16,020	2,395	26,580	8,100
26.	2,365	4,130	2,810	550	1,360	1,365	4,975	3,420	12,500	1,980	22,180	6,400
27.	2,210	2,910	2,210	820	820	1,970	4,375	3,110	9,420	2,845	14,700	5,010
28.	4,390	4,130	1,820	1,365	1,615	550	4,390	3,110	8,320	3,320	12,500	5,010
29.	3,110	3,110	2,210	820	1,365	1,485	4,000	3,530	8,320	3,970	14,700	4,700
30.	3,420		2,540		820		3,315	4,825				
31.							51,810	18,930	45,500	17,560	66,840	14,040
Maximum.	4,390	52,810	65,410	2,370	1,750	4,000	51,810	18,930	45,500	17,560	66,840	14,040
Minimum.	1,245	1,365	1,365	550	385	550	2,206	2,370	2,960	1,560	5,335	3,760
Mean	2,204	11,286	7,283	1,268	1,069	2,094	8,206	6,157	17,894	6,565	29,647	6,491

Note.—Discharge determined from poorly defined rating curves.

Daily and monthly discharges, in liters per second, of Calacran River near Sabang, Oas, Albay, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	3 970	1 405	965	910	622	542	810	29 510	810			
2	3 320	2 395	715	564	682	446	810	77 230	1 164			
3	3 570	2 395	715	564	824	446	1 164	46 606	1 164			
4	2 545	2 080	555	564	824	446	1 164	34 774	3 460			
5	2 960	1 880	715	564	682	446	1 383	31 990	3 460			
6	2 395	1 785	715	564	1 000	669	1 383	10 878	4 614			
7	2 290	1 595	715	682	824	542	890	8 094	7 630			
8	2 785	1 405	555	564	824	542	890	38 950	6 934			
9	2 185	1 595	555	564	1 000	446	1 164	21 550	6 704			
10	1 980	1 405	555	564	1 164	446	9 950	11 110				
11	1 585	1 405	555	564	1 164	368	8 094	7 630				
12	1 585	1 220	715	564	1 164	368	2 038	6 704				
13	8 540	1 220	380	564	824	542	1 383	4 820				
14	6 800	1 220	380	564	824	542	1 383	4 820				
15	5 395	715	1 135	564	669	669	1 068	11 110				
16	5 395	715	1 135	564	669	669	1 068	11 110				
17	5 170	405	715	748	669	542	669	18 076				
18	4 700	880	715	748	669	542	669	18 076				
19	4 250	1 050	880	682	542	738	3 632	12 270				
20	3 570	1 405	715	682	669	600	3 246	9 486				
21	2 960	1 595	555	564	1 267	600	4 382	7 862				
22	2 615	1 405	555	564	1 383	810	16 678	6 934				
23	2 395	1 220	555	564	1 383	810	13 662	5 078				
24	2 395	1 220	555	564	1 383	810	13 662	5 078				
25	2 395	1 220	555	564	1 383	810	13 662	5 078				
26	2 395	1 220	555	564	1 383	810	13 662	5 078				
27	2 395	1 220	555	564	1 383	810	13 662	5 078				
28	2 395	1 220	555	564	1 383	810	13 662	5 078				
29	2 395	1 220	555	564	1 383	810	13 662	5 078				
30	2 395	1 220	555	564	1 383	810	13 662	5 078				
31	1 405	1 405	1 000	682	446	542	3 460	970				
Maximum	8 540	2 395	1 135	1 198	1 383	1 164	16 678	77 230	7 630			
Minimum	1 405	405	405	466	446	304	669	970	810			
Mean	3 239	1 268	745	663	813	566	4 413	14 521	4 354			

Note.—See footnote to daily discharge for 1921.

## ALBAY PROVINCE

## NACICI RIVER, LIGAO

LOCATION.—In the barrio of Nacici, about 10 m. north of the Ligao-Tabacco Provincial first-class road.

RECORDS AVAILABLE.—From January 4, 1921, to November 30, 1921.

GAGE.—Standard metric gage board vertically fastened to a tree on the right bank of the river.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND BANKS.—One channel at all stages; straight for 15 m. above and 25 m. below the station. Stream bed stony and sandy. Right bank high and of earthy texture; left bank low, of earthy texture and covered with vegetation.

EXTREMES OF DISCHARGE.—Maximum discharge, recorded during period of observation, 44,850 second-liters on October 21, 1921; river frequently dry.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Gage read twice daily. Daily discharge determined from a poorly-defined curve.

*Discharge measurements of Nacici River, near Nacici, Ligao, Albay*

Date	Made by—	Gage height (meters)	Discharge (second- liters)	Remarks
<b>1921</b>				
January 4...	S. M. M	11	153	
January 22..	O. Buenaventura	08	204	
February 7 .	do	08	218	
February 24 .	S. M. M	14	77	
March 9 .....	O. Buenaventura	14	374	
March 23	do	12	260	
June 6....	do.	10	242	
July 5	S. Musa .	25	854	
August 6 .	Buchanan and Musa	14	572	
September 1 .	S. Musa .	25	641	
September 2 .	O. Buenaventura	22	657	
September 17..	do.	18	924	
September 21 .	do	14	660	
October 10	S. Musa..	18	667	
October 12..	O. Buenaventura	20	977	

Daily and monthly discharges, in liters per second, of Nacici River near Nacici, Ligao, Albay, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1...		47	148	107	892	2,827	5,450	1,265	4,255	1,760	272	
2...		47	148	107	892	2,827	5,450	1,265	1,760	1,760	4,820	
3...		47	148	107	892	2,827	24,940	1,265	1,265	2,412	(*)	
4...		47	148	107	1,065	2,827	9,520	1,265	1,495	1,760	(*)	
5...	107	47	148	107	1,265	2,827	3,265	592	1,265	1,760	(*)	
6...	107	47	1	107	1,265	2,827	2,827	592	1,265	1,760	(*)	
7...	107	47	9,520	107	1,265	2,827	2,827	592	1,265	3,265	(*)	
8...	107	47	325	476	1,265	2,827	2,827	592	892	1,760	(*)	
9...	107	47	322	210	1,265	2,827	2,827	892	1,760	1,760	(*)	
10...	107	47	372	476	1,265	6,160	2,827	1,265	1,760	1,265	(*)	
11...	107	47	372	476	1,265	2,827	2,827	1,265	2,060	1,495	(*)	
12...	107	47	476	476	1,265	2,827	2,827	1,760	3,265	4,255	(*)	
13...	107	47	476	476	1,265	4,255	2,827	1,265	a 47	2,412	(*)	
14...	107	47	476	476	1,265	4,255	2,827	1,760	210	3,265	(*)	
15...	107	47	1,760	476	1,265	5,450	2,827	592	3,265	3,736	(*)	
16...	107	47	5,450	476	1,265	5,450	2,827	592	1,760	2,412	(*)	
17...	107	47	2,142	476	1,265	4,255	2,827	592	1,760	1,265	(*)	
18...	107	47	1,760	476	1,265	4,255	2,827	372	1,760	1,760	(*)	
19...	107	372	1,760	476	1,265	4,255	2,827	1,265	1,760	1,760	(*)	
20...	107	1,760	1,265	476	1,265	4,255	2,827	730	5,450	44,850	592	
21...	72	1,07	1,265	476	1,265	4,255	2,827	1,265	2,412	2,412	148	
22...	72	72	476	476	1,265	4,255	2,827	2,412	1,760	372	372	
23...	47	47	107	476	1,265	4,255	2,827	2,412	1,760	730	a 5	
24...	47	372	107	476	1,265	4,255	2,060	1,265	1,760	1,760	(*)	
25...	29	372	107	476	1,265	4,255	2,060	1,265	2,412	6,900	(*)	
26...	47	372	107	476	1,265	4,255	1,495	1,760	2,412	1,760	(*)	
27...	47	107	107	476	1,265	5,450	1,495	1,760	4,255	4,820	(*)	
28...	47	148	107	476	1,265	5,450	1,495	372	2,412	1,760	(*)	
29...	47		107	476	1,265	5,450	1,495	372	2,412	1,760	(*)	
30...	47		107	476	1,265	5,450	1,495	1,265	1,760	14,026	(*)	
31...	47		107	476	1,265	5,450	1,495	1,495		3,265	(*)	
Maximum..	107	1,760	9,520	476	1,495	8,600	24,940	2,412	5,450	44,850	4,820	
Minimum..	29	47	107	107	892	2,827	1,495	1,133	a 47	372	(*)	
Mean .....	84	163	1,031	381	1,230	4,139	3,646	1,133	1,921	4,010	210	

a Channel closed.



## ALBAY PROVINCE

## PAULOG RIVER, LIGAO

LOCATION.—About 27.7 km. from Legaspi on downstream side of bridge on the Legaspi-Ligao Road.

RECORDS AVAILABLE.—From February 10, 1919, to July 15, 1922. Also from November 27, 1910, to April 20, 1912, at old location very near the present station.

GAGE.—Standard metric gage board fastened vertically to stone abutment of bridge.

DISCHARGE MEASUREMENTS.—Made by wading at low water; from bridge, at high water.

CHANNEL AND BANKS.—Channel is straight for 20 m. above and 25 m. below. At measuring section bed of stream is sandy and shifting. Both banks are high and not subject to overflow. Flow is fairly uniform.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation 58,540 second-liters on December 23, 1910. Minimum discharge, 1,026 second-liters on June 14 to 18, 1920.

DIVERSIONS.—None above station.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge from November 27, 1910, to April 20, 1912, determined from a poorly-defined rating curve. From February 10, 1919, to December 25, 1921, determined from a fairly well-defined rating curve. From December 26, 1921, to July 15, 1922, determined from well-defined rating curve. Gage read twice daily.

*Discharge measurements of Paulog River near Tuburan, Ligao, Albay*

Date	Made by —	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1910</b>				
August 19	J. I. Quinn		1,560	
September 10. . .	do		1,112	
October 17	do.		2,330	
November 27..	do	82	2,360	
December 14	do.	85	2,620	
December 19	do.	87	2,770	
December 27	do.	91	3,470	
<b>1911</b>				
January 11..	W. Demers	90	3,150	
January 19.. . . .	do	86	2,800	
January 20..	do	88	2,900	
January 30..	do.	86	2,540	
February 1..	do	88	2,550	
February 9..	do	86	2,780	
February 20..	do.	1 06	6,460	
February 27..	do	92	3,389	
March 19	do.	87	2,303	
March 30. . . . .	do.	90	2,200	
April 10	do.	94	3,360	
April 24. . . . .	do.	91	2,320	
May 4..	do	93	2,570	
May 19. . . . .	do	87	2,230	
May 29	do.	88	2,290	
June 5. . . . .	do.	86	2,080	
June 12. . . . .	do	90	2,120	
June 21..	do	86	1,980	
June 23..	do	89	2,680	
June 26..	do	86	2,070	
July 12. . . . .	do	93	3,270	
July 29	do	92	2,770	
August 2..	do.	89	2,390	
August 11. . . . .	do	87	1,990	

## Discharge measurements of Paulog River near Tuburan, Ligao, Albay—Ctd.

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1911</b>				
August 19...	W. Demers.	95	3,520	
September 5...	do	87	2,390	
September 7...	do.	86	1,940	
September 9...	do	85	1,720	
September 20...	do.	87	2,490	
September 22...	do.	87	2,510	
September 23...	do.	89	2,390	
October 4...	do.	87	2,050	
October 9...	do.	87	2,070	
October 30...	do.	85	1,930	
December 5...	do.	87	1,900	
December 7...	do.	87	2,250	
December 16...	do.	89	2,090	
December 19...	do	87	2,220	
December 23...	do	86	1,730	
<b>1912</b>				
January 4...	do.	85	1,890	
January 16...	do.	87	2,070	
January 19...	do.	86	1,780	
January 27...	do.	84	1,910	
February 7...	do.	85	1,750	
February 14...	do.	85	1,910	
February 19...	do.	84	1,870	
February 26...	do.	86	1,680	
March 11...	do	83	1,490	
March 21...	do.	84	1,630	
April 3...	do	84	1,620	
April 10...	do	82	1,610	
<b>1919</b>				
February 8...	W. Demers and A. Fegarido	48	2,130	
March 1...	A. Fegarido	45	2,010	
March 21...	do.	45	1,860	
April 15...	do.	44	1,680	
April 24...	A. Fegarido	40	1,490	
May 9...	do	43	1,580	
May 16...	do.	42	1,250	
June 5...	do.	38	1,414	
June 30...	do.	42	1,330	
July 7...	do.	42	1,480	
July 19...	do	43	1,570	
July 22...	do	42	1,540	
August 18...	do.	38	1,340	
September 4...	A. Fegarido and M. B. Canas.	36	1,370	
September 16...	do	38	1,560	
September 25...	do	36	1,120	
October 8...	do.	38	1,180	
October 22...	do	40	1,480	
November 3...	do	40	1,620	
November 4...	do.	36	1,400	
November 13...	do	40	1,520	
November 18...	do	84	5,380	
December 1...	A. Fegarido	50	2,290	
December 11...	do.	46	1,980	
December 15...	do	48	2,180	
<b>1920</b>				
January 9...	M. B. Canas.	52	2,480	
January 14...	do.	52	2,710	
February 6...	do	48	2,030	
February 16...	do.	50	2,110	
February 25...	do.	48	2,080	
March 8...	do.	48	2,290	
March 16...	do.	46	1,960	
March 26...	do.	46	1,860	
March 29...	do	46	1,460	
April 10...	do	42	1,140	
April 22...	do.	44	1,460	
May 4...	do.	40	1,560	
May 18...	do.	44	1,900	
June 7...	do.	44	1,470	
June 18...	do.	48	1,740	
July 8...	do.	48	1,640	
July 21...	do.	44	1,310	
July 29...	M. B. Canas and O. Buenaventura.	46	1,440	
August 4...	O. Buenaventura	45	1,878	

*Discharge measurements of Paulog River near Tuburan, Ligao, Albay—Ctd.*

Date	Made by—	Gage height (meters)	Discharge (second- liters)	Remarks
<b>1920</b>				
August 11 .....	O. Buenaventura	43	1,244	
August 16 .....	do.	40	1,058	
August 28 .....	do.	42	1,245	
September 3 .....	do.	47	1,642	
September 11 .....	do.	46	1,534	
September 17 .....	do.	49	1,837	
September 25 .....	do.	59	3,199	
October 6 .....	do.	51	2,070	
October 21 .....	do.	49	1,823	
October 29 .....	do.	46	1,569	
November 4 .....	do.	54	2,460	
November 12 .....	do.	42	1,225	
November 19 .....	do.	47	1,574	
November 27 .....	do.	46	1,564	
December 3 .....	do.	48	1,739	
December 18 .....	do.	46	1,639	
December 20 .....	do.	46	1,627	
<b>1921</b>				
January 5 .....	do.	44	1,391	
January 15 .....	do.	48	1,270	
January 21 .....	do.	45	1,479	
January 31 .....	do.	50	2,031	
February 5 .....	do.	48	1,760	
February 15 .....	do.	47	1,675	
February 21 .....	do.	49	1,831	
February 28 .....	do.	45	1,487	
March 8 .....	do.	57	2,861	
March 18 .....	do.	54	2,408	
March 21 .....	do.	53	2,276	
March 31 .....	do.	48	1,710	
April 5 .....	do.	49	1,830	
April 21 .....	do.	45	1,456	
March 30 .....	do.	41	1,119	
May 3 .....	do.	40	1,091	
May 9 .....	do.	44	1,362	
June 9 .....	do.	46	1,592	
June 30 .....	do.	42	1,175	
July 9 .....	do.	46	1,338	
July 27 .....	do.	47	1,459	
August 4 .....	do.	47	1,491	
August 23 .....	do.	44	1,344	
September 1 .....	do.	47	1,674	
September 17 .....	do.	48	1,774	
September 20 .....	do.	46	1,552	
October 4 .....	do.	48	1,739	
October 12 .....	do.	50	1,875	
November 3 .....	do.	68	4,806	
November 30 .....	S. Musa	48	1,732	
December 5 .....	do.	83	7,763	
December 21 .....	O. Buenaventura	54	2,518	
December 29 .....	do.	44	3,133	
<b>1922</b>				
January 3 .....	do.	40	2,585	
January 11 .....	do.	38	2,398	
January 16 .....	do.	45	3,187	
January 26 .....	do.	38	2,222	
February 2 .....	do.	43	3,027	
February 23 .....	do.	35	2,048	
March 3 .....	do.	34	1,903	
March 23 .....	do.	34	1,907	
April 3 .....	do.	33	1,661	
April 19 .....	do.	32	1,531	
April 28 .....	do.	28	1,441	
May 4 .....	do.	29	1,579	
May 12 .....	do.	27	1,305	
May 18 .....	do.	28	1,539	
May 23 .....	do.	34	1,777	
June 3 .....	do.	26	1,477	
June 10 .....	W. Damers and O. Buenaventura.	28	1,556	
June 19 .....	S. Musa and O. Buenaventura.	28	1,499	
July 8 .....	O. Buenaventura	29	1,553	

NOTE.—Gage-height readings from February 10, 1919 referred, to new datum.

*Daily and monthly discharges, in liters per second, of Paulog River near Taburan, Ligao, Ambos Camarines, for the year 1910*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1												1,535
2												1,535
3												3,785
4												3,085
5												2,715
6												2,200
7												2,030
8												1,700
9												1,700
10												2,200
11												1,885
12												1,885
13												1,885
14												2,370
15												2,030
16												3,240
17												6,565
18												3,085
19												2,030
20												1,050
21												*18,115
22												*58,540
23												*18,815
24												*28,165
25												*10,785
26												7,440
27												1,700
28												*23,015
29												1,700
30												*12,165
31												7,265
												5,515
Maximum.												58,540
Minimum												1,050
Mean												1,700
												7,744

NOTE.—Discharge determined from poorly defined rating curve applicable from November, 1910, to April, 1912.

\* Discharges over 8,000 second-liters estimated from extension of curve.

Daily and monthly discharges, in liters per second, of Paulog River near Tuburan, Ligao, Albay, for the year 1911

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	2,715	2,370	2,715	2,715	4,465	2,200	16,015	3,065	2,030	2,030	2,030	2,370
2.....	2,540	2,370	2,715	2,715	3,415	2,030	5,340	2,370	2,030	1,865	2,030	2,540
3.....	2,370	2,370	2,510	2,715	3,415	2,030	3,065	2,370	2,030	1,865	2,030	2,370
4.....	2,540	2,200	2,370	2,715	3,065	2,030	3,415	2,370	2,030	3,390	2,030	2,370
5.....	2,540	2,200	2,370	2,715	3,065	2,030	3,065	2,370	2,030	3,390	2,030	2,370
6.....	2,540	2,200	2,370	2,715	2,890	2,030	2,540	2,370	2,030	3,415	2,030	2,370
7.....	2,370	2,370	2,370	2,715	2,715	2,200	3,590	2,370	2,030	2,540	3,065	2,200
8.....	2,715	2,200	2,370	3,210	2,715	2,030	3,765	2,370	2,030	2,200	2,370	2,200
9.....	2,540	2,030	2,200	3,415	2,715	2,370	2,890	2,200	2,540	2,030	2,030	2,200
10.....	2,540	2,200	2,370	3,415	2,715	2,030	11,290	2,200	2,030	2,030	2,030	2,200
11.....	2,540	3,940	2,715	2,715	2,715	2,370	3,765	2,370	2,030	2,030	2,030	2,200
12.....	2,370	3,240	2,715	2,540	2,370	2,370	11,290	2,200	2,370	2,370	2,030	2,200
13.....	2,370	2,715	4,290	2,540	2,370	2,370	6,040	2,030	2,540	2,030	2,030	2,200
14.....	2,370	3,065	2,370	2,540	2,370	2,030	4,115	2,030	2,540	1,865	2,370	2,715
15.....	2,200	2,715	2,370	2,540	2,370	2,370	3,890	2,030	2,540	2,030	2,890	2,540
16.....	2,200	2,715	2,370	2,715	2,370	2,370	3,065	1,165	2,540	1,865	2,715	2,370
17.....	2,200	2,715	4,290	2,715	2,370	2,370	3,065	3,765	2,540	1,700	2,715	2,370
18.....	2,030	3,210	2,370	2,715	2,370	2,370	3,065	3,765	2,540	1,865	2,715	2,370
19.....	2,030	3,210	2,370	2,715	2,370	2,370	3,065	3,765	2,540	1,865	2,715	2,370
20.....	2,030	4,815	2,370	2,715	2,370	2,200	3,890	3,065	2,540	1,700	2,715	2,370
21.....	2,030	3,765	2,370	2,715	2,030	2,030	3,065	2,540	2,540	1,700	2,715	2,370
22.....	2,030	3,765	2,370	3,065	2,030	2,030	3,415	2,540	2,370	1,700	2,715	2,370
23.....	2,030	3,890	2,370	3,065	2,030	2,030	3,415	3,415	2,370	1,700	2,715	2,370
24.....	2,030	3,065	2,370	2,715	2,540	2,030	2,540	3,065	2,030	1,700	2,715	2,370
25.....	2,030	3,415	2,890	2,540	2,370	2,030	2,540	2,715	2,030	1,700	2,715	2,370
26.....	2,030	3,240	2,890	2,715	2,370	2,030	2,370	2,370	2,030	1,700	2,715	2,370
27.....	2,030	3,065	3,065	2,715	2,370	2,030	3,415	2,200	2,370	1,700	2,715	2,370
28.....	2,030	3,065	3,065	2,715	2,370	2,030	3,415	2,200	2,370	1,700	2,715	2,370
29.....	2,030	...	3,065	2,540	6,390	4,115	3,590	2,200	2,030	1,865	2,200	2,030
30.....	2,030	...	2,715	3,590	2,540	2,890	3,240	2,030	2,030	1,700	2,370	2,030
31.....	2,030	...	2,715	...	2,370	...	3,065	2,030	...	1,700	...	2,030
Maximum..	2,715	4,815	4,290	3,940	6,390	4,115	16,015	5,165	3,065	5,390	3,065	2,715
Minimum..	2,030	2,030	2,200	2,370	2,030	2,030	2,370	2,030	2,030	1,700	2,030	2,030
Mean.....	2,255	2,943	2,645	2,826	2,758	2,269	4,516	3,407	2,309	2,116	2,292	2,249

NOTE.—Discharge determined from poorly defined rating curve, applicable from November, 1910, to April, 1912.

Daily and monthly discharges, in liters per second, of Paulog River near Tuburan, Ligao, Albay for the year 1912

Day	January	February	March	April	May	June	July	August	September	October	November	December
1...	2,030	1,865	1,865	1,700	...	...	...	...	...	...	...	...
2...	2,030	1,700	1,700	1,700	...	...	...	...	...	...	...	...
3...	2,030	1,865	1,700	1,700	...	...	...	...	...	...	...	...
4...	2,030	2,370	1,535	1,700	...	...	...	...	...	...	...	...
5...	2,030	2,030	1,700	1,700	...	...	...	...	...	...	...	...
6...	2,030	1,865	1,700	1,535	...	...	...	...	...	...	...	...
7...	2,030	2,030	1,700	1,535	...	...	...	...	...	...	...	...
8...	2,030	2,030	1,700	1,370	...	...	...	...	...	...	...	...
9...	2,030	1,865	1,700	1,370	...	...	...	...	...	...	...	...
10...	2,030	2,030	1,535	1,535	...	...	...	...	...	...	...	...
11...	2,030	2,030	1,535	1,700	...	...	...	...	...	...	...	...
12...	2,370	2,030	1,865	1,700	...	...	...	...	...	...	...	...
13...	2,370	1,865	1,700	1,700	...	...	...	...	...	...	...	...
14...	2,200	1,865	1,535	1,700	...	...	...	...	...	...	...	...
15...	2,200	1,700	1,700	1,700	...	...	...	...	...	...	...	...
16...	2,200	1,700	1,700	1,700	...	...	...	...	...	...	...	...
17...	2,200	1,865	1,700	1,700	...	...	...	...	...	...	...	...
18...	2,030	1,700	1,700	1,700	...	...	...	...	...	...	...	...
19...	2,030	1,865	1,700	1,700	...	...	...	...	...	...	...	...
20...	2,030	3,765	1,700	1,700	...	...	...	...	...	...	...	...
21...	2,030	2,715	1,700	...	...	...	...	...	...	...	...	...
22...	2,030	2,370	1,700	...	...	...	...	...	...	...	...	...
23...	2,030	2,030	1,535	...	...	...	...	...	...	...	...	...
24...	2,030	2,030	1,535	...	...	...	...	...	...	...	...	...
25...	2,030	2,030	1,535	...	...	...	...	...	...	...	...	...
26...	1,865	2,030	1,535	...	...	...	...	...	...	...	...	...
27...	1,700	2,030	1,700	...	...	...	...	...	...	...	...	...
28...	1,700	2,030	1,535	...	...	...	...	...	...	...	...	...
29...	1,700	1,700	1,535	...	...	...	...	...	...	...	...	...
30...	1,700	...	1,535	...	...	...	...	...	...	...	...	...
31...	2,030	...	1,700	...	...	...	...	...	...	...	...	...
Maximum	4,290	3,765	1,865	1,700	...	...	...	...	...	...	...	...
Minimum	1,700	1,700	1,535	1,370	...	...	...	...	...	...	...	...
Mean	2,088	2,114	1,597	1,642	...	...	...	...	...	...	...	...

NOTE.—Discharge determined from poorly defined rating curve applicable from November, 1910, to April, 1912. Station maintenance discontinued after April 20, 1912.

Daily and monthly discharges, in liters per second, of Paulog River near Tuburan, Ligao, Albay, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.	.....	.....	1,970	1,970	1,571	1,571	1,756	1,400	1,248	1,248	1,400	2,776
2.	.....	.....	2,191	1,970	1,571	1,400	3,127	1,400	1,248	1,248	1,400	1,435
3.	.....	.....	2,191	2,191	1,571	1,680	2,191	1,400	1,248	1,248	1,400	2,191
4.	.....	.....	1,970	1,970	1,571	1,248	2,191	3,595	1,119	1,248	1,119	2,191
5.	.....	.....	1,970	1,970	1,970	1,400	1,400	1,571	1,066	1,400	1,862	2,191
6.	.....	.....	1,862	1,970	1,970	1,400	1,400	1,571	1,066	1,248	1,600	2,659
7.	.....	.....	1,970	1,756	1,571	1,400	1,400	1,571	1,066	1,400	1,400	2,893
8.	.....	.....	1,970	1,970	1,571	1,571	1,400	1,571	1,862	1,248	1,400	2,425
9.	.....	.....	1,970	2,191	1,571	4,531	1,400	1,571	1,862	3,010	1,119	2,191
10.	.....	2,191	2,080	2,191	1,571	2,191	1,400	1,756	1,571	1,400	1,119	2,191
11.	.....	2,191	1,970	1,970	1,571	1,756	1,400	1,756	1,571	1,066	1,571	1,970
12.	.....	2,659	1,970	1,970	1,571	1,571	2,191	2,191	2,191	1,066	1,400	1,970
13.	.....	2,080	1,970	1,970	1,571	1,400	1,571	1,400	1,400	3,361	3,010	2,425
14.	.....	2,080	2,080	1,970	1,571	1,400	1,400	1,400	1,248	1,400	2,663	2,191
15.	.....	2,659	1,862	1,970	1,571	1,400	1,400	1,400	1,248	1,119	12,955	2,191
16.	.....	1,862	1,970	1,970	1,571	1,400	1,680	1,248	1,248	1,119	12,955	2,191
17.	.....	1,862	1,970	1,970	1,571	1,400	1,400	1,248	2,191	2,893	3,127	12,370
18.	.....	1,970	2,191	1,970	1,571	1,400	1,680	1,248	1,400	2,893	3,127	12,370
19.	.....	1,970	1,970	1,756	1,400	1,571	1,680	1,248	1,400	2,776	1,571	12,955
20.	.....	2,191	1,970	1,970	1,400	1,571	1,400	1,970	1,400	1,400	1,571	5,935
21.	.....	1,970	1,970	1,970	1,400	1,571	1,400	1,400	1,400	1,400	1,571	2,893
22.	.....	1,970	1,970	1,970	1,400	1,400	1,571	1,400	1,400	1,400	1,571	2,893
23.	.....	1,970	1,862	1,970	1,400	1,400	1,571	1,400	1,400	1,400	1,571	2,776
24.	.....	1,862	1,970	1,756	1,571	1,400	1,970	1,400	1,066	2,191	1,571	2,659
25.	.....	1,862	1,970	1,970	1,571	1,400	1,571	1,400	1,066	2,191	1,571	2,659
26.	.....	2,659	1,970	1,970	1,400	3,361	1,400	1,400	1,248	1,400	1,970	2,425
27.	.....	1,970	2,191	1,571	1,400	2,425	1,400	1,400	1,248	1,400	1,970	2,425
28.	.....	2,080	2,191	1,571	1,400	1,400	1,400	1,400	1,248	1,400	2,425	2,425
29.	.....	.....	1,970	1,571	1,400	1,571	1,571	1,756	1,248	1,400	2,663	2,893
30.	.....	.....	1,862	1,571	1,400	1,571	1,400	2,425	1,248	1,660	2,893	2,893
31.	.....	.....	1,970	1,571	1,571	1,571	1,400	1,400	1,248	1,566	2,893	2,659
Maximum	.....	2,659	2,191	2,191	1,970	4,531	3,127	3,595	7,105	3,361	12,955	12,955
Minimum	.....	1,862	1,862	1,571	1,400	1,248	1,400	1,248	1,066	1,066	1,066	1,970
Mean	.....	2,120	1,999	1,918	1,553	1,698	1,615	1,597	1,586	1,564	2,397	3,223

NOTE.—Discharge determined from a rating curve fairly well-defined between 1,000 and 2,200 second-liters. Discharge above and below these values are estimated from prolongation of curve.

Daily and monthly discharges, in liters per second, of Paulog River near Taburan, Liguao, Albay, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	2,730	1,730	1,730	1,537	1,380	1,244	1,730	1,380	1,537	1,537	1,380	5,705
2.....	3,745	1,730	1,730	1,537	1,380	1,244	1,380	1,380	1,730	1,537	1,380	1,960
3.....	3,295	1,730	1,730	1,537	1,380	1,244	1,380	1,380	1,730	1,537	21,380	1,730
4.....	3,295	1,537	1,730	1,537	1,380	1,244	1,380	1,380	1,537	4,055	2,730	1,630
5.....	3,010	1,730	1,730	1,537	1,380	1,244	2,462	1,380	1,380	1,960	1,960	2,595
6.....	2,730	1,730	1,730	1,537	1,380	1,244	1,380	1,380	1,380	1,960	1,960	1,960
7.....	2,205	1,730	1,730	1,537	1,380	1,244	1,380	1,380	1,455	1,730	1,730	1,730
8.....	2,205	1,730	1,730	1,537	1,380	1,244	1,380	1,244	1,537	1,537	1,537	1,537
9.....	1,960	1,730	1,730	1,537	3,295	1,244	2,595	1,244	1,537	1,537	1,537	1,537
10.....	1,960	1,730	1,730	1,537	1,244	1,244	2,595	1,244	1,537	1,537	1,537	1,537
11.....	2,462	1,730	1,730	1,380	1,244	1,244	1,960	1,244	1,537	1,730	1,537	1,730
12.....	2,205	2,052	1,537	1,380	1,244	1,244	1,730	1,244	1,730	5,045	1,960	1,537
13.....	2,205	2,052	1,537	1,380	1,244	1,244	1,455	1,244	1,537	9,530	1,960	1,537
14.....	2,205	2,462	1,537	1,380	1,380	1,026	1,244	1,186	2,332	9,530	1,960	1,540
15.....	2,462	1,960	1,537	1,380	1,380	1,026	1,244	10,160	1,840	2,332	1,960	1,730
16.....	3,010	1,960	1,537	1,380	1,380	1,026	1,244	2,332	1,840	1,960	1,730	1,537
17.....	2,462	1,730	1,537	1,380	1,380	1,730	1,244	1,960	1,840	1,960	1,537	1,537
18.....	2,205	1,730	1,537	1,380	1,380	1,140	1,244	1,730	2,595	1,730	1,537	1,537
19.....	2,205	1,960	1,537	1,380	1,960	1,140	1,244	1,730	2,595	1,840	1,537	1,537
20.....	2,205	1,730	1,537	1,380	1,380	1,244	1,244	1,380	1,840	1,730	1,537	1,537
21.....	2,205	1,730	1,537	1,380	1,380	1,244	1,244	1,380	1,840	1,730	1,537	1,537
22.....	1,960	2,205	1,537	1,380	1,140	1,244	1,455	1,244	2,595	1,960	1,537	1,537
23.....	1,960	1,730	1,537	1,380	1,070	1,244	1,380	1,244	2,595	1,840	1,537	1,537
24.....	1,960	1,730	1,537	1,380	1,070	1,244	1,380	1,244	2,595	1,840	1,537	1,537
25.....	1,960	1,730	1,537	1,380	1,070	1,244	1,380	1,244	2,595	1,840	1,537	1,537
26.....	1,960	1,730	1,537	1,380	1,380	1,244	1,380	1,244	2,595	1,840	1,537	1,537
27.....	1,960	1,730	1,537	1,380	1,380	1,244	1,380	1,244	2,595	1,840	1,537	1,537
28.....	1,730	1,730	1,537	1,380	1,380	1,960	1,380	1,244	1,730	1,840	1,537	1,537
29.....	1,730	1,730	1,537	1,380	1,244	1,960	1,380	1,244	1,730	1,840	1,537	1,537
30.....	1,730	1,730	1,537	1,380	1,244	1,960	1,380	1,244	1,730	1,840	2,462	1,380
31.....	1,730	1,730	1,537	1,380	1,244	1,960	1,380	1,244	1,730	1,840	2,462	1,310
Maximum	3,745	2,730	1,730	1,537	3,295	1,960	2,595	10,160	2,595	9,830	21,380	5,705
Minimum	1,730	1,537	1,537	1,380	1,070	1,026	1,244	1,186	1,380	1,380	1,380	1,310
Mean.....	2,829	1,835	1,605	1,438	1,388	1,256	1,549	1,674	1,771	2,293	2,369	1,729

NOTE.—Daily discharge determined from a fairly defined curve, applicable throughout the year 1920 to December 25, 1921.



Daily and monthly discharges, in liters per second, of Paulog River near Tuburan, Liguao, Albay, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	1,310	2,205	1,960	1,730	1,244	1,244	1,380	1,960	3,462	1,730	2,595	1,730
2.....	1,960	1,960	1,840	1,730	1,244	1,244	1,730	1,840	1,730	1,730	12,965	1,630
3.....	1,380	1,840	1,730	1,730	1,244	1,244	5,540	5,540	1,380	1,730	4,715	2,082
4.....	1,380	1,730	1,730	1,630	1,244	1,380	7,520	2,332	1,730	1,730	3,150	1,730
5.....	1,380	1,730	1,730	1,730	1,244	1,537	4,550	1,537	1,630	1,730	3,295	7,355
6.....	1,380	1,537	2,595	1,730	1,244	1,730	2,205	1,380	2,332	1,537	3,010	2,970
7.....	1,380	1,537	4,890	1,730	1,380	1,537	1,730	1,380	2,332	1,637	3,010	2,405
8.....	1,380	1,537	2,462	1,730	1,380	1,537	1,730	1,630	1,730	1,730	1,730	1,960
9.....	1,730	1,537	2,462	1,730	1,380	2,082	1,630	1,537	1,730	1,082	5,375	1,730
10.....	1,537	1,537	2,462	1,630	1,244	1,730	1,537	2,082	1,730	1,730	18,080	1,537
11.....	1,380	1,455	2,205	1,537	1,140	1,537	1,455	1,730	1,730	1,730	5,540	1,380
12.....	1,380	1,380	2,082	1,537	1,140	1,380	1,380	1,630	9,500	1,730	3,150	1,310
13.....	1,380	1,730	1,960	1,537	1,244	1,455	1,537	1,537	3,443	2,082	2,332	1,244
14.....	1,380	1,380	1,960	1,537	1,244	1,537	1,537	1,455	1,960	1,840	1,840	1,730
15.....	1,380	1,380	2,332	1,537	1,244	1,537	2,205	1,380	1,960	1,730	1,455	1,730
16.....	5,705	1,380	2,730	1,537	1,244	1,455	2,082	1,380	1,960	1,730	1,380	1,537
17.....	1,630	1,380	2,205	1,537	1,244	1,310	1,730	1,380	1,730	1,730	1,380	1,730
18.....	1,537	1,380	2,462	1,537	1,244	1,244	1,730	1,380	1,537	1,630	1,380	1,730
19.....	1,380	4,890	5,705	1,537	1,244	1,244	1,730	1,380	1,537	1,537	1,380	1,730
20.....	1,380	4,065	3,010	1,380	1,380	1,244	1,730	1,380	1,380	1,537	1,380	1,630
21.....	1,380	2,595	2,462	1,380	1,380	1,244	2,205	1,380	1,730	1,537	1,840	1,380
22.....	1,380	2,595	2,332	1,380	1,244	1,244	2,205	1,380	1,730	1,537	2,595	1,244
23.....	1,380	2,730	2,205	1,380	1,244	1,244	2,205	1,455	1,730	1,537	2,595	1,244
24.....	1,380	5,705	1,960	1,380	1,310	1,244	2,205	1,455	1,730	1,537	4,065	1,310
25.....	1,380	3,443	1,960	1,380	1,380	1,380	1,840	1,537	1,730	2,332	5,705	1,380
26.....	1,380	2,595	1,730	1,380	1,380	1,380	1,537	1,537	1,730	2,462	4,220	4,780
27.....	1,380	2,595	1,730	1,244	1,380	1,630	1,537	1,380	3,010	1,960	3,443	4,585
28.....	1,380	2,082	1,730	1,380	1,380	1,630	1,537	1,380	2,332	1,730	3,295	3,823
29.....	2,205	.....	1,730	1,244	1,380	1,630	1,380	1,455	1,960	1,630	1,840	3,465
30.....	3,591	.....	1,730	1,244	1,310	1,244	1,380	6,200	1,840	1,630	1,730	3,133
31.....	1,960	.....	1,730	.....	1,310	.....	1,380	2,730	.....	1,462	.....	3,133
Maximum.....	5,705	5,705	5,705	1,730	1,380	2,082	7,520	6,200	9,500	2,462	18,080	7,355
Minimum.....	1,310	1,380	1,730	1,140	1,140	1,244	1,380	1,380	1,380	1,462	1,380	1,244
Mean.....	1,687	2,153	2,331	1,523	1,285	1,419	2,134	1,740	2,037	1,786	3,675	2,263

Note.—Discharge determined from well-defined rating curve, applicable from December 26, 1921, to July 15, 1922.

*Daily and monthly discharges, in liters per second, of Paulog River near Tuburan, Ligao, Albay, for the year 1922*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	3,133	2,354	2,145	1,866	1,623	2,145	1,954					
2.....	2,985	2,845	2,046	1,866	1,783	1,623	2,466					
3.....	2,845	2,354	1,954	1,783	1,550	1,346	2,145					
4.....	2,845	2,246	2,046	1,783	1,480	1,346	1,783					
5.....	2,712	2,585	2,046	1,783	1,480	3,295	1,623					
6.....	2,585	2,585	2,046	1,783	1,346	3,295	1,623					
7.....	2,585	2,354	1,954	1,783	1,346	1,954	1,623					
8.....	2,585	2,354	1,954	1,783	1,412	1,412	1,550					
9.....	2,585	2,354	1,954	1,783	1,480	1,346	1,550					
10.....	2,585	2,246	1,954	1,783	1,480	1,480	1,480					
11.....	2,585	2,246	1,954	1,783	1,480	1,480	3,133					
12.....	9,070	2,246	1,954	1,783	1,480	1,346	2,145					
13.....	3,644	2,145	2,046	1,783	1,550	1,346	1,550					
14.....	3,133	2,145	2,046	1,783	1,480	1,346	1,480					
15.....	3,465	2,145	3,644	1,783	1,480	1,346	1,480					
16.....	3,295	2,145	2,145	1,783	1,480	1,346	1,480					
17.....	2,985	2,145	2,145	1,783	1,480	1,346	1,550					
18.....	2,845	2,145	2,145	1,783	1,480	1,480	1,480					
19.....	2,585	2,145	2,046	1,783	1,480	1,480	1,480					
20.....	2,585	2,354	2,046	1,783	1,480	1,480	1,480					
21.....	2,585	2,246	1,954	1,623	2,246	1,480	1,480					
22.....	2,585	2,145	1,954	1,623	2,145	1,480	1,480					
23.....	2,585	2,145	1,954	1,623	1,954	1,480	1,480					
24.....	2,585	2,145	1,954	1,623	1,954	1,480	1,480					
25.....	2,354	2,145	3,465	1,623	1,954	1,480	1,480					
26.....	4,066	2,145	3,465	1,623	1,700	1,480	1,480					
27.....	3,644	2,145	3,295	1,623	1,623	1,412	1,412					
28.....	3,295	2,145	1,954	1,623	1,623	1,346	1,346					
29.....	2,985	.....	1,954	1,623	1,550	1,346	1,346					
30.....	2,585	.....	1,866	1,623	2,145	2,145	2,145					
31.....	2,585	.....	1,866	.....	2,145	.....	.....					
Maximum	9,070	2,845	3,644	1,866	2,246	3,295	3,133					
Minimum	2,354	2,145	1,866	1,623	1,346	1,346	1,346					
Mean	3,029	2,264	2,137	1,735	1,642	1,596	1,589					

NOTE.—See footnote to daily discharge for 1921.

## ALBAY PROVINCE

## POLANGUI RIVER, POLANGUI

LOCATION.—About 175 m. from Polangui and 40 Km. from Legaspi on the down stream side of bridge on the Legaspi-Libon Road.

RECORDS AVAILABLE.—February 10, 1911, to April 20, 1912.

GAGE.—No longer in existence. A standard metric gage board was fastened horizontally to a tree on right bank of river about 175 m. from the bridge. Chain 14.01 m. long used in measuring height.

DISCHARGE MEASUREMENTS.—Made by wading at low water, from concrete bridge at high water.

CHANNEL AND BANKS.—One channel at all times; straight for 400 m. above and 200 m. below the gaging section. Right and left bank only 1.5 m. high; subject to overflow, and covered with woods. Measuring section ideal but has rather shifting stream bed and flow rather swift.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 19,145 second-liters on July 1, 1911; minimum discharge, 400 second-liters on March 9, 1912.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge applicable from February to June, 1911, determined from a fairly well-defined curve from 550 to 3,300 second-liters; and from July, 1911, to April, 1912, from a fairly well-defined curve from 800 to 1,700 second-liters. Gage read twice daily.

*Discharge measurements of Polangui River near Polangui, Albay*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1911</b>				
February 10...	W. Demers	1 06	1,270	
February 11 .	do	1 10	1,750	
February 17 .	do	1 10	1,790	
February 18 .	do	1 12	1,870	
February 22 .	do	1 11	1,820	
March 9 . . .	do	1 08	1,617	
March 31 . .	do	1 00	1,030	
April 4 . . .	do	99	890	
April 17 . . .	do	1 08	1,820	
May 5 . . . .	do	1 02	1,390	
May 6 . . . .	do	1 03	1,670	
May 12 . . .	do	1 00	1,680	
May 26 . . .	do	95	1,140	
May 26 . . .	do	95	1,200	
June 10 . . .	do	95	1,070	
June 22 . . .	do	96	1,110	
July 11 . . .	do	1 47	6,810	
July 24 . . .	do	1 10	2,300	
August 7 . . .	do	98	1,300	
August 18 . .	do	94	1,516	
September 18 .	do	91	760	
September 23 .	do	90	680	
October 5 . . .	do	92	780	
October 10 . .	do	88	560	
October 28 . .	do	91	720	
December 7 . .	do	90	860	
December 15 . .	do	91	890	
December 20 . .	do	92	980	
December 27 . .	do	92	1,050	

*Discharge measurements of Polangui River near Polangui, Albay—Ctd.*

Date	Made by—	Gage height (meters)	Discharge (second- liters)	Remarks
<b>1912</b>				
January 8..	W. Demers.	1 00	1,760	
January 6..	do.	95	1,280	
January 15....	do	87	730	
January 18..	do.	92	1,030	
January 26..	do.	92	1,000	
February 8..	do	94	990	
February 13.	do.	92	990	
February 20..	do.	90	840	
February 27....	do	90	830	
March 4....	do.	91	780	
March 26....	do.	1 00	900	
March 14....	do.	94	810	
April 6....	do.	91	880	
April 11....	do.	1 01	720	

Daily and monthly discharges, in liters per second, of Polangui River near Polangui, Albay, for the year 1911

Day	January	February	March	April	May	June	July	August	September	October	November	December
1....			2,370	1,500	1,650	1,050	19,145	1,710	1,370	795	875	1,115.
2....			2,450	1,500	1,650	1,125	7,405	1,640	1,200	955	1,115	1,035
3....			2,290	1,500	1,810	1,050	3,855	1,540	1,200	875	795	955
4....			2,290	1,500	1,650	1,125	3,095	1,455	1,035	1,710	1,370	955
5....			2,290	1,500	1,650	1,200	2,905	1,285	1,115	1,710	955	955
6....			2,130	1,350	1,730	690	2,715	1,370	1,385	1,115	955	955
7....			2,130	1,500	1,730	1,200	2,525	2,070	1,285	1,115	1,200	1,035
8....			2,130	1,500	1,650	1,050	2,160	1,200	1,115	875	1,115	1,115
9....		1,970	2,130	3,090	1,575	1,050	2,620	1,370	1,035	955	725	955
10....		2,610	2,130	3,670	1,500	1,275	4,555	955	725	875	955	875
11....		2,610	2,290	2,610	2,370	900	8,760	955	955	955	1,115	955
12....		2,630	2,130	2,430	1,350	1,200	3,655	1,115	725	875	1,035	875
13....		2,630	2,650	2,430	1,350	1,350	11,760	1,200	955	795	795	895
14....		2,630	2,650	1,970	1,350	1,350	7,960	1,115	955	955	875	795
15....		2,290	1,810	1,970	1,200	1,575	4,760	1,285	955	955	1,115	795
16....		2,290	1,810	3,010	1,275	1,575	3,855	1,285	795	955	1,370	875
17....		2,290	1,650	2,650	1,125	1,650	3,855	1,285	795	875	1,200	795
18....		2,370	1,650	2,950	1,275	1,650	3,855	1,285	955	875	1,370	795
19....		2,450	1,810	1,970	1,275	1,730	3,190	1,800	955	875	1,200	795
20....		2,610	1,650	2,210	1,275	1,206	4,255	2,525	725	795	1,455	725
21....		2,770	1,650	2,130	3,490	1,275	3,190	2,715	590	795	1,370	875
22....		2,610	1,650	1,650	1,425	1,200	3,095	3,570	875	795	1,285	955
23....		2,290	1,650	2,690	1,350	1,500	3,000	2,525	795	795	1,285	955
24....		2,210	1,730	1,425	1,050	1,050	2,715	3,485	875	795	1,370	955
25....		2,310	1,650	1,810	1,050	1,200	2,525	3,380	655	795	955	875
26....		2,770	1,890	1,890	1,200	900	2,070	2,430	1,035	725	1,285	725
27....		2,690	1,890	1,650	1,350	1,425	1,890	2,160	725	725	1,115	875
28....		2,530	1,650	1,730	690	1,650	1,980	1,625	1,035	590	1,200	1,115
29....			1,575	1,730	690	1,650	1,540	1,800	1,035	590	1,115	955
30....			1,050	1,730	1,200	1,650	1,890	1,625	795	795	725	955
31....			1,425	1,730	690	1,425	1,890	1,455	955	955	1,035	955
Maximum	2,930	2,930	2,450	3,570	3,490	1,730	19,145	6,485	1,370	1,710	1,455	1,115
Minimum	2,370	2,370	2,225	1,350	690	690	1,540	955	590	590	725	725
Mean.....	2,475	2,475	2,225	1,974	1,471	1,239	4,203	1,864	951	843	1,087	912

NOTE.—Daily discharges from February to June, 1911, determined from a fairly well-defined curve from 550 to 2,300 second-liters.

*Daily and monthly discharges, in liters per second, of Polangui River near Polangui, Albay, for the year 1912*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.	955	1,115	1,370	1,540	....	....	....	....	....	....	....	....
2.	1,115	1,115	1,540	1,540	....	....	....	....	....	....	....	....
3.	955	1,035	795	1,370	....	....	....	....	....	....	....	....
4.	955	1,115	795	1,200	....	....	....	....	....	....	....	....
5.	1,285	1,370	875	875	....	....	....	....	....	....	....	....
6.	1,455	1,115	1,370	955	....	....	....	....	....	....	....	....
7.	1,115	955	1,370	875	....	....	....	....	....	....	....	....
8.	795	1,115	1,115	955	....	....	....	....	....	....	....	....
9.	875	1,115	1,400	1,035	....	....	....	....	....	....	....	....
10.	955	955	795	1,370	....	....	....	....	....	....	....	....
11.	955	1,115	1,115	1,710	....	....	....	....	....	....	....	....
12.	1,285	875	1,285	1,625	....	....	....	....	....	....	....	....
13.	1,200	955	955	1,370	....	....	....	....	....	....	....	....
14.	1,115	875	1,115	1,200	....	....	....	....	....	....	....	....
15.	525	955	1,200	1,455	....	....	....	....	....	....	....	....
16.	875	955	795	1,200	....	....	....	....	....	....	....	....
17.	795	955	795	1,455	....	....	....	....	....	....	....	....
18.	875	955	875	1,455	....	....	....	....	....	....	....	....
19.	955	955	1,200	1,455	....	....	....	....	....	....	....	....
20.	955	1,035	1,035	1,285	....	....	....	....	....	....	....	....
21.	955	2,160	955	....	....	....	....	....	....	....	....	....
22.	1,035	1,370	795	1,455	....	....	....	....	....	....	....	....
23.	1,035	1,035	1,800	....	....	....	....	....	....	....	....	....
24.	955	955	1,035	....	....	....	....	....	....	....	....	....
25.	1,035	955	1,625	....	....	....	....	....	....	....	....	....
26.	955	685	1,285	....	....	....	....	....	....	....	....	....
27.	955	1,200	1,625	....	....	....	....	....	....	....	....	....
28.	955	1,115	1,625	....	....	....	....	....	....	....	....	....
29.	955	955	1,625	....	....	....	....	....	....	....	....	....
30.	1,035	....	1,035	....	....	....	....	....	....	....	....	....
31.	1,115	....	1,035	....	....	....	....	....	....	....	....	....
Maximum.	1,455	2,160	1,800	1,710	....	....	....	....	....	....	....	....
Minimum.	525	685	400	725	....	....	....	....	....	....	....	....
Mean....	999	1,070	1,149	1,259	....	....	....	....	....	....	....	....

NOTE.—Discharges from July, 1911, to April, 1912, determined from a fairly well-defined curve from 800 to 1,700 second-liters.

## ALBAY PROVINCE

## QUINALI RIVER, GUINOBATAN

LOCATION.—About 25 Km. from Legaspi and about 60 m. above Reynold's Bridge on the Legaspi-Ligao Road.

RECORDS AVAILABLE.—From February 15, 1919, to December 31, 1922. Also from March 24, 1910, to April 20, 1912, inclusive, at a place 60 m. below present station.

GAGE.—Vertical and inclined sections for low and high water respectively set on the right bank of the river.

DISCHARGE MEASUREMENTS.—Made by wading at low water, from bridge about 65 m. below the gage, at high water.

CHANNEL AND BANKS.—Channel straight for 25 m. above and 60 m. below regular section. Right bank is high, left bank low and subject to overflow. Stream bed at measuring section sandy and very shifting. Flow uniform.

EXTREMES OF DISCHARGES.—Maximum discharge recorded during period of observation, 61,310 second-liters on December 21, 1922, estimated from extension of rating curve. Minimum discharge, 208 second-liters on June 21, 1920.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharges from March, 1910, to June 20, 1911 and from June 21, 1911, to April, 1912, determined from fairly well-defined rating curves. From February to December, 1922, from fairly well-defined rating curves. Gage read twice daily.

*Discharge measurements of Quinali River, near Banao, Guinobatan, Albay*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1910</b>				
March 24 . . . . .	J. I. Quinn . . . . .	.48	4,740	
April 11 . . . . .	do. . . . .	.49	3,510	
May 17 . . . . .	do. . . . .	.53	3,120	
May 26 . . . . .	do. . . . .	.58	3,180	
July 6 . . . . .	do. . . . .	.54	3,000	
July 23 . . . . .	do. . . . .	.54	3,060	
August 2 . . . . .	do. . . . .	.58	3,740	
August 12 . . . . .	do. . . . .	.53	2,340	
August 24 . . . . .	do. . . . .	.55	3,020	
August 24 . . . . .	do. . . . .	.55	2,270	
August 27 . . . . .	do. . . . .	.62	5,930	
August 27 . . . . .	do. . . . .	.62	4,170	
September 10 . . . . .	H. V. Hall . . . . .	.58	3,560	
September 10 . . . . .	do. . . . .	.58	2,672	
October 17 . . . . .	do. . . . .	.62	6,720	
October 17 . . . . .	do. . . . .	.62	6,830	
November 22 . . . . .	J. I. Quinn . . . . .	.74	12,970	
November 25 . . . . .	do. . . . .	.60	5,720	
November 25 . . . . .	do. . . . .	.60	5,180	
November 27 . . . . .	do. . . . .	.60	5,320	
December 14 . . . . .	do. . . . .	.58	6,390	
December 19 . . . . .	do. . . . .	.61	6,490	
December 27 . . . . .	W. Demers . . . . .	.64	9,480	

*Discharge measurements of Quinali River, near Banao, Guinobatan,  
Albay—Continued*

Date	Made by—	Gage height (meters)	Discharge (second- liters)	Remarks
<b>1911</b>				
January 11..	W. Demers	57	6,700	
January 19..	do.	50	5,220	
January 30..	do.	56	4,570	
February 2..	do.	57	3,820	
February 9..	do.	56	4,190	
February 20..	do.	70	12,500	
February 28..	do.	62	6,783	
March 10..	do.	57	4,571	
March 30..	do.	58	3,960	
April 10..	do.	76	11,710	
April 22..	do.	57	3,320	
May 4..	do.	56	4,220	
May 11..	do.	55	3,140	
May 20.....	do.	55	3,090	
May 29.....	do.	55	3,180	
June 5..	do.	55	2,800	
June 12..	do.	55	2,750	
June 21..	do.	55	3,070	
June 23..	do.	58	3,770	
June 26..	do.	54	2,190	
July 12..	do.	61	5,950	
August 2..	do.	58	5,040	
August 11....	do.	55	4,060	
August 19....	do.	74	7,730	
September 5....	do.	55	3,920	
September 7....	do.	55	4,360	
September 9....	do.	55	4,540	
September 20....	do.	58	4,270	
September 22....	do.	58	4,360	
September 23....	do.	63	6,410	
September 23....	do.	63	6,530	
October 4..	do.	57	3,720	
October 27..	do.	57	3,500	
December 5..	do.	54	2,570	
December 16..	do.	58	3,070	
December 19..	do.	58	2,820	
December 19..	do.	57	2,210	
December 28..	do.	57	2,820	
<b>1912</b>				
January 2..	do.	63	3,380	
January 4..	do.	63	3,660	
January 16..	do.	59	3,180	
January 19..	do.	57	3,160	
January 27..	do.	57	3,060	
February 7..	do.	58	3,380	
February 14..	do.	58	2,580	
February 19..	do.	56	2,780	
February 26..	do.	58	2,900	
March 11..	do.	54	2,620	
March 21..	do.	58	2,500	
April 3..	do.	55	2,240	
April 10..	do.	51	2,190	
<b>1919</b>				
February 14..	A. Fegarido..	43	4,270	
March 1..	do.	41	3,060	
March 21..	do.	33	2,710	
April 16..	do.	36	2,580	
April 24..	do.	35	2,610	
May 9..	do.	31	2,100	
May 16..	do.	28	1,640	
June 5..	do.	28	1,660	
June 30..	do.	42	3,420	
July 19..	do.	42	8,490	
July 22..	do.	71	8,850	
July 7..	do.	43	8,520	
August 18..	do.	44	4,080	
September 4..	A. Fegarido and M. Canas.	41	3,210	
September 18..	do.	59	4,560	
September 26..	do.	40	2,720	
October 9..	do.	64	5,620	
November 8..	do.	40	2,720	



*Discharge measurements of Quinali River, near Banao, Guinobatan,  
Albay—Continued*

Date	Made by—	Gage height (meters)	Discharge (second- liters)	Remarks
<b>1919</b>				
December 1 . . . . .	A. Fegarido . . . . .	75	9,270	
December 11 . . . . .	do . . . . .	56	5,120	
December 15 . . . . .	do . . . . .	52	4,240	
<b>1920</b>				
January 9 . . . . .	M. B. Canas . . . . .	49	4,400	
January 14 . . . . .	do . . . . .	47	4,300	
February 6 . . . . .	do . . . . .	37	2,800	
February 17 . . . . .	do . . . . .	46	4,210	
February 25 . . . . .	do . . . . .	44	4,010	
March 8 . . . . .	do . . . . .	38	2,110	
March 16 . . . . .	do . . . . .	41	1,400	
March 26 . . . . .	do . . . . .	34	1,440	
March 30 . . . . .	do . . . . .	32	1,670	
April 9 . . . . .	do . . . . .	26	1,960	
April 23 . . . . .	do . . . . .	20	2,210	
May 4 . . . . .	do . . . . .	30	1,880	
May 19 . . . . .	do . . . . .	26	1,710	
June 7 . . . . .	do . . . . .	17	1,290	
June 18 . . . . .	do . . . . .	18	1,320	
July 9 . . . . .	do . . . . .	39	3,340	
July 20 . . . . .	M. Canas and O. Buena- ventura . . . . .	60	2,470	
July 29 . . . . .	do . . . . .	61	2,500	
August 4 . . . . .	O. Buenaventura . . . . .	22	1,966	
August 4 . . . . .	do . . . . .	22	2,423	
August 12 . . . . .	do . . . . .	20	2,216	
August 16 . . . . .	do . . . . .	19	2,166	
August 28 . . . . .	do . . . . .	50	5,676	
September 3 . . . . .	do . . . . .	33	3,595	
September 11 . . . . .	do . . . . .	26	2,805	
September 17 . . . . .	do . . . . .	33	3,595	
September 25 . . . . .	do . . . . .	43	4,813	
October 5 . . . . .	do . . . . .	39	4,179	
October 21 . . . . .	do . . . . .	41	4,577	
October 29 . . . . .	do . . . . .	29	3,197	
November 4 . . . . .	do . . . . .	66	8,154	
November 12 . . . . .	do . . . . .	29	3,121	
November 19 . . . . .	do . . . . .	32	3,524	
November 27 . . . . .	do . . . . .	29	3,125	
December 8 . . . . .	do . . . . .	48	5,421	
December 13 . . . . .	do . . . . .	32	3,696	
December 20 . . . . .	do . . . . .	29	3,140	
<b>1921</b>				
January 15 . . . . .	do . . . . .	16	2,150	
January 21 . . . . .	do . . . . .	23	2,593	
January 31 . . . . .	do . . . . .	55	6,801	
February 5 . . . . .	do . . . . .	21	2,503	
February 15 . . . . .	do . . . . .	16	3,376	
February 21 . . . . .	do . . . . .	10	2,970	
February 28 . . . . .	do . . . . .	14	3,187	
March 8 . . . . .	do . . . . .	45	8,203	
March 18 . . . . .	do . . . . .	18	3,836	
March 21 . . . . .	do . . . . .	24	4,878	
March 31 . . . . .	do . . . . .	14	3,336	
April 5 . . . . .	do . . . . .	10	2,898	
April 21 . . . . .	do . . . . .	08	2,022	
April 30 . . . . .	do . . . . .	04	1,829	
May 3 . . . . .	do . . . . .	06	1,671	
May 9 . . . . .	do . . . . .	08	1,550	
June 9 . . . . .	do . . . . .	20	2,294	
June 30 . . . . .	do . . . . .	12	2,970	
July 9 . . . . .	do . . . . .	22	3,984	
July 29 . . . . .	do . . . . .	15	3,281	
August 2 . . . . .	do . . . . .	13	2,962	
August 23 . . . . .	do . . . . .	01	1,726	
September 5 . . . . .	do . . . . .	08	3,347	
September 16 . . . . .	do . . . . .	18	4,734	
September 20 . . . . .	do . . . . .	15	4,207	
October 5 . . . . .	do . . . . .	14	4,009	
October 14 . . . . .	do . . . . .	10	3,857	
November 3 . . . . .	do . . . . .	66	12,543	
November 7 . . . . .	do . . . . .	39	7,462	
November 30 . . . . .	S. Musa . . . . .	41	7,945	

\* Unreliable measurements.

*Discharge measurements of Quinali River, near Banao, Guinobatan,  
Albay—Continued*

Date	Made by—	Gage height (meters)	Discharge (second- liters)	Remarks
<b>1921</b>				
Decembe 5.	S. Musa . . . .	45	9,240	. . . . .
December 23 . . . .	O. Buenaventura . .	25	5,276	. . . . .
December 29 . . . .	. . . do.	19	4,392	. . . . .
<b>1922</b>				
January 3. . . . .	do.	16	4,101	. . . . .
January 11 . . . . .	do.	12	3,720	. . . . .
January 16 . . . . .	do.	19	4,522	. . . . .
January 27 . . . . .	do.	14	4,053	. . . . .
February 2 . . . . .	do.	23	3,315	. . . . .
February 23. . . . .	do.	08	3,255	. . . . .
March 3 . . . . .	do.	05	3,087	. . . . .
March 23. . . . .	do.	005	2,495	. . . . .
April 3 . . . . .	do.	— 02	3,249	. . . . .
April 19 . . . . .	do.	— 05	2,965	. . . . .
April 28. . . . .	do.	— 06	2,379	. . . . .
May 4 . . . . .	do.	— 04	2,558	. . . . .
May 12 . . . . .	do.	— 12	2,264	. . . . .
May 18. . . . .	do.	— 11	2,179	. . . . .
May 23. . . . .	do.	— 06	2,956	. . . . .
June 3 . . . . .	do.	— 15	2,002	. . . . .
June 8 . . . . .	W. Demers and O. Bue- naventura	—, 11	2,145	. . . . .
June 19 . . . . .	S. Musa and O. Buena- ventura.	— 10	2,041	. . . . .
July 8 . . . . .	do.	08	3,136	. . . . .
August 3 . . . . .	O. Buenaventura	10	3,615	. . . . .
August 11 . . . . .	do.	12	3,987	. . . . .
August 25 . . . . .	do . . . . .	08	2,377	. . . . .
August 28 . . . . .	do . . . . .	065	2,287	. . . . .
September 15. . . . .	do . . . . .	03	2,766	. . . . .
September 19 . . . . .	do . . . . .	092	3,757	. . . . .
September 20 . . . . .	do . . . . .	04	2,868	. . . . .
October 6. . . . .	do . . . . .	14	4,283	. . . . .
October 10. . . . .	do . . . . .	12	3,980	. . . . .
October 21. . . . .	do . . . . .	09	2,615	. . . . .
October 24. . . . .	do . . . . .	08	3,492	. . . . .
November 13 . . . . .	do . . . . .	09	4,136	. . . . .
December 9 . . . . .	do . . . . .	16	5,087	. . . . .
December 12 . . . . .	do . . . . .	17	5,250	. . . . .
December 19 . . . . .	do . . . . .	14	4,728	. . . . .

NOTE.—Gage height readings from February 14, 1919, referred to different data.

Daily and monthly discharges, in liters per second, of Quinali River near Banao, Guinobatan, Albay, for the year 1910

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.				2,260	6,230	3,950	6,290	6,290	2,950	..	27,180	3,950
2.				2,260	5,090	3,580	4,700	7,600	2,950	5,880	28,220	6,710
3.				2,260	4,320	3,580	4,700	5,480	4,700	16,780	12,620	5,780
4.				2,690	4,700	4,320	8,060	5,880	5,880	8,530	10,540	11,580
5.				2,260	4,320	3,950	7,600	5,090	5,480	6,290	7,600	15,740
6.				2,260	5,880	3,580	4,320	2,950	5,090	6,710	5,880	10,540
7.				2,260	5,090	3,950	4,320	3,950	5,880	6,290	5,880	6,290
8.				2,260	8,060	3,580	2,690	3,240	2,460	3,240	6,710	5,880
9.				2,260	6,290	3,950	1,860	2,460	3,950	4,320	6,710	6,710
10.				2,690	3,950	4,320	1,860	2,460	3,950	5,090	5,880	5,880
11.				1,860	3,580	5,480	1,860	2,460	3,580	5,090	5,880	5,880
12.				2,260	2,950	5,880	1,860	2,460	3,580	4,320	7,600	5,880
13.				2,260	2,950	4,700	5,250	2,750	3,580	5,090	6,710	5,880
14.				2,260	2,950	3,580	5,250	3,580	4,320	5,090	6,710	5,880
15.				1,860	2,950	3,580	4,700	3,580	3,240	5,090	5,880	5,880
16.				1,860	2,460	4,320	6,290	3,950	9,500	3,950	4,700	5,880
17.				2,060	2,950	6,710	2,460	3,950	7,150	5,090	5,880	11,060
18.				2,060	2,950	4,320	2,950	3,580	5,090	5,090	6,290	8,530
19.				2,260	3,240	4,320	2,060	3,240	4,320	4,320	9,500	5,090
20.				2,950	3,580	5,880	2,460	3,240	5,090	3,580	9,500	4,700
21.				5,880	3,580	7,600	2,460	4,700	5,880	4,320	7,150	5,090
22.				9,000	2,950	4,320	2,260	3,950	7,150	4,320	6,290	6,710
23.				3,240	2,460	3,950	2,460	2,950	6,710	5,090	5,880	5,880
24.			1,670	5,090	2,950	4,320	2,260	3,240	5,480	5,880	5,880	11,580
25.			2,060	3,580	3,580	4,700	2,060	7,600	6,710	4,320	5,880	10,540
26.			1,670	3,950	3,580	4,700	2,460	8,060	6,710	3,580	5,880	9,000
27.			1,860	3,580	3,950	4,320	2,460	5,880	7,600	3,580	6,290	6,710
28.			2,260	4,320	3,580	7,600	2,260	3,580	6,710	5,090	4,700	14,700
29.			2,460	5,090	4,320	4,700	2,060	3,580	5,880	5,090	5,880	7,150
30.			2,260	5,090	4,320	4,700	2,260	2,950	4,700	5,090	5,880	5,880
31.			2,260		4,320		2,260	3,580	.....	5,090	..	5,090
Maximum.			2,460	9,000	8,060	7,600	8,060	8,060	9,500	16,780	28,220	15,740
Minimum.			1,670	1,860	2,460	3,580	1,860	2,460	2,460	5,203	4,700	2,460
Mean.			2,062	3,148	3,384	4,590	3,414	4,144	5,245	5,203	8,094	7,380

NOTE.—Daily discharge determined from a fairly well-defined rating curve, applicable from March 24, 1910, to April 20, 1912.

*Daily and monthly discharges, in liters per second, of Quinali River near Banao, Guinobatan, Albay, for the year 1911*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	5,880	3,580	3,950	3,240	3,240	2,460	24,300	4,550	2,900	3,820	3,350	3,580
2	5,090	3,580	3,950	3,240	3,580	2,690	8,660	4,300	2,900	3,580	3,350	4,060
3	3,950	2,950	3,580	3,240	3,580	2,460	4,800	3,820	2,900	3,350	3,350	3,820
4	5,090	3,580	4,320	3,240	3,580	2,460	8,360	3,120	2,900	3,580	3,350	3,820
5	5,480	2,950	3,950	3,240	3,580	2,460	4,060	3,820	3,120	3,820	3,350	3,820
6	5,090	2,950	3,580	3,580	3,580	2,460	4,060	3,820	2,900	3,820	3,350	3,820
7	3,950	2,460	3,580	3,580	3,580	2,690	4,300	3,350	3,120	3,820	3,350	3,820
8	3,580	3,580	3,240	3,580	3,240	2,460	3,350	2,900	3,120	3,820	4,060	3,820
9	5,880	3,580	2,950	3,580	3,240	2,690	3,350	2,900	3,350	3,820	3,580	3,350
10	5,090	2,460	3,580	8,530	3,580	2,460	6,110	2,900	3,820	3,350	3,820	3,350
11	3,950	4,320	4,700	3,950	3,240	3,240	8,960	3,120	3,580	3,350	3,820	3,350
12	3,950	5,090	5,480	3,580	2,950	3,240	5,840	3,120	3,580	3,350	3,820	3,350
13	4,320	4,320	4,320	3,580	2,950	3,240	11,500	3,120	3,580	3,350	3,820	3,350
14	4,320	3,950	3,950	3,580	2,950	3,240	13,740	2,900	3,580	3,350	3,820	3,350
15	3,950	3,950	3,950	3,580	2,950	3,240	8,660	2,900	3,580	3,350	3,820	3,350
16	5,580	3,580	3,580	3,580	2,950	3,240	5,840	2,900	3,580	3,350	4,060	3,820
17	2,690	4,320	3,580	3,950	2,950	5,090	5,320	2,900	3,580	3,350	3,820	3,820
18	3,580	3,580	3,950	3,580	2,950	4,700	4,550	3,820	3,820	3,350	3,820	3,580
19	4,320	6,710	3,580	2,950	2,690	4,320	4,300	4,300	3,580	3,350	3,820	3,820
20	3,580	5,880	3,580	3,580	2,460	4,320	4,300	4,800	3,580	3,120	3,820	4,060
21	2,950	7,600	3,580	3,240	2,690	3,350	4,550	3,820	3,820	3,120	3,820	3,820
22	3,580	5,480	3,950	3,580	2,460	2,900	4,060	3,580	5,320	3,350	3,580	3,820
23	2,950	4,700	3,580	5,880	2,460	3,120	4,800	3,820	4,060	3,350	3,350	3,820
24	3,240	3,580	3,580	4,700	2,460	3,120	4,550	4,300	4,550	2,900	3,350	3,820
25	3,580	4,700	2,950	3,580	2,460	3,120	3,580	3,580	3,820	2,900	3,350	3,820
26	2,950	6,710	3,580	2,950	2,690	2,900	3,580	4,060	3,350	3,350	3,350	3,820
27	2,690	4,700	3,580	2,950	2,690	2,680	4,550	3,820	3,350	3,350	3,350	3,820
28	3,580	4,320	3,580	3,240	2,690	3,580	5,060	3,820	3,820	3,350	3,350	3,820
29	3,580	.....	3,950	3,580	2,690	7,490	5,320	3,820	3,820	3,350	3,350	3,580
30	3,580	.....	3,580	3,580	2,460	8,960	4,800	2,900	3,820	3,350	3,350	3,580
31	2,950	.....	3,580	3,580	2,460	.....	4,550	2,900	.....	3,350	.....	3,580
Maximum	5,880	7,600	5,480	8,530	3,580	8,960	24,300	4,800	5,320	3,820	4,060	4,060
Minimum	2,690	2,460	2,950	2,950	2,460	2,460	3,350	3,120	2,900	2,900	3,350	3,350
Mean	3,978	4,269	3,769	3,918	2,962	3,484	6,251	3,593	3,563	3,412	3,585	3,711

NOTE.—Daily discharge determined from a fairly well-defined rating curve, applicable from March 24, 1910, to April 20, 1912.

Daily and monthly discharges, in liters per second, of Quinali River near Banao, Guinobatan, Albay, for the year 1912

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	3,580	3,350	3,580	3,120								
2.....	3,580	3,350	3,580	2,900								
3.....	3,820	3,350	3,350	3,120								
4.....	3,820	3,350	3,350	3,120								
5.....	4,300	3,820	3,120	2,900								
6.....	4,300	3,820	2,900	2,900								
7.....	4,300	3,820	2,900	2,900								
8.....	3,820	3,580	3,120	3,120								
9.....	3,820	3,580	3,120	2,460								
10.....	3,820	3,580	2,900	2,460								
11.....	7,210	3,580	2,900	2,460								
12.....	4,550	3,580	3,120	2,060								
13.....	3,820	3,820	3,120	2,060								
14.....	3,820	3,580	2,900	2,260								
15.....	3,820	3,820	2,900	2,460								
16.....	3,820	3,820	2,900	2,260								
17.....	3,580	3,580	3,120	2,260								
18.....	3,580	3,580	3,120	2,260								
19.....	3,350	5,060	3,580	2,260								
20.....	3,350	5,060	4,300	2,260								
21.....	3,350	3,820	3,820									
22.....	3,350	3,820	3,820									
23.....	3,820	3,820	3,820									
24.....	3,820	3,820	3,820									
25.....	3,820	3,820	3,820									
26.....	3,820	3,820	3,820									
27.....	3,820	3,820	3,820									
28.....	3,350	3,580	3,580									
29.....	3,350	3,580	3,580									
30.....	3,350	3,350	3,350									
31.....	3,120	3,350	3,350									
Maximum ..	7,210	5,060	4,300	3,120								
Minimum ..	3,120	3,350	2,900	2,060								
Mean ..	3,848	3,774	3,364	2,613								

NOTE.—Daily discharge determined from a fairly well-defined rating curve. Applicable from March 24, 1910, to April 20, 1912.

Daily and monthly discharges, in liters per second, of Quinali River near Banao, Guinobatan, Albay, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	.....	.....	3 220	2 810	2 270	1 780	5 320	3 780	4 530	3 080	4 380	8 610
2	.....	.....	3 220	2 810	2 180	1 930	5 960	3 640	4 530	2 940	3 640	8 610
3	.....	.....	3 080	2 690	2 180	1 850	4 480	3 360	3 360	3 360	3 640	5 960
4	.....	.....	3 220	2 810	2 270	1 780	4 480	4 580	3 220	4 580	3 640	7 080
5	.....	.....	3 080	2 690	2 370	1 850	4 380	3 640	3 080	3 500	5 960	7 160
6	.....	.....	3 080	2 690	2 270	1 930	3 800	5 000	3 900	3 500	5 960	7 160
7	.....	.....	3 080	2 690	2 095	2 270	3 500	6 120	2 940	3 930	6 120	6 120
8	.....	.....	3 080	2 690	2 270	2 580	4 380	6 120	3 500	4 080	5 800	5 640
9	.....	.....	3 220	3 080	2 095	10 800	3 640	5 800	5 800	7 080	5 800	5 480
10	.....	.....	3 220	2 940	1 930	5 160	3 360	5 480	4 530	6 280	5 000	5 160
11	.....	.....	3 080	2 690	1 930	3 220	4 230	4 540	6 600	4 580	4 530	5 480
12	.....	.....	3 220	2 810	2 010	3 500	3 780	4 380	5 320	3 780	3 930	5 160
13	.....	.....	3 220	2 690	1 780	2 810	3 360	5 320	5 160	3 360	4 530	4 530
14	.....	.....	3 080	2 690	1 850	2 690	2 810	4 380	4 680	4 080	15 790	4 840
15	.....	.....	3 080	2 690	1 850	2 580	2 580	3 080	4 530	5 320	10 230	4 840
16	.....	.....	3 080	2 690	1 850	2 370	3 220	3 500	4 530	4 230	10 230	5 000
17	.....	.....	3 640	2 940	1 850	2 180	3 780	3 500	4 530	3 640	12 760	8 440
18	.....	.....	3 500	2 940	1 850	2 810	3 080	3 640	6 120	3 500	14 580	9 150
19	.....	.....	3 500	2 940	1 780	3 080	3 500	3 500	6 600	6 120	10 230	8 150
20	.....	.....	3 500	2 940	1 780	3 080	3 500	6 120	4 380	6 440	7 160	5 160
21	.....	.....	3 500	2 940	1 780	3 080	3 500	4 380	4 080	4 840	7 420	5 160
22	.....	.....	3 500	2 940	1 720	2 810	3 930	4 540	3 780	4 380	7 420	4 580
23	.....	.....	3 220	2 940	1 720	2 470	5 940	4 080	4 080	4 080	6 120	4 580
24	.....	.....	3 500	2 940	1 720	2 180	6 220	6 220	3 640	4 230	5 960	4 530
25	.....	.....	3 220	2 940	2 370	2 370	9 120	4 580	3 500	4 530	5 960	3 640
26	.....	.....	3 500	2 810	3 640	14 240	3 780	4 230	3 220	3 500	5 960	3 640
27	.....	.....	3 500	2 810	3 640	9 120	3 220	4 230	3 640	4 080	5 960	3 930
28	.....	.....	3 360	2 810	2 570	3 500	5 400	3 640	3 500	3 500	6 600	5 960
29	.....	.....	.....	2 810	1 930	3 500	7 800	4 380	3 640	3 640	6 600	5 960
30	.....	.....	.....	2 810	1 850	3 360	4 380	6 280	3 220	3 440	6 440	5 960
31	.....	.....	.....	.....	1 930	.....	4 580	.....	.....	4 580	.....	.....
Maximum	.....	4 080	3 220	3 080	3 640	14 240	8 270	6 920	7 590	7 080	15 790	9 150
Minimum	.....	3 220	2 690	2 270	1 720	1 780	2 580	3 960	2 940	2 940	3 640	3 640
Mean	.....	3 461	3 024	2 610	2 054	3 480	4 529	4 551	4 537	4 527	6 877	5 742

NOTE.—Daily discharge determined from well-defined curves between 1,750 and 4,500 second-liters.

Daily and monthly discharges, in liters per second, of Quinali River near Banoo, Guinobatan, Albay, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	4,380	2,940	1,331	790	554	329	3,845	2,510	4,075	2,800	2,800	10,590
2.....	4,230	3,080	1,230	790	508	329	4,075	2,510	3,300	2,800	2,800	10,590
3.....	3,780	3,080	1,331	742	462	312	4,315	2,510	3,300	2,800	2,800	5,385
4.....	7,760	2,810	1,280	642	417	372	4,315	2,330	3,000	2,800	2,800	5,385
5.....	7,420	2,810	1,280	694	329	372	4,190	2,330	3,000	2,800	2,800	5,385
6.....	7,420	2,810	1,280	694	329	372	4,190	2,330	3,000	2,800	2,800	5,385
7.....	6,600	2,580	1,382	694	246	329	4,075	2,240	2,600	3,730	4,075	6,330
8.....	6,600	2,580	1,382	694	246	329	4,075	2,240	2,600	3,730	4,075	6,330
9.....	4,380	2,940	1,280	694	554	329	4,075	2,240	2,510	3,500	4,960	5,095
10.....	4,230	2,940	1,230	600	508	286	4,190	2,240	2,330	3,000	4,075	4,440
11.....	4,080	2,940	1,131	554	508	286	4,565	2,240	2,330	2,700	3,845	4,190
12.....	3,930	2,940	1,082	462	508	246	4,825	2,240	2,330	2,510	3,300	3,780
13.....	3,640	2,690	1,082	417	417	246	5,385	2,240	2,420	2,510	3,200	3,400
14.....	4,080	3,220	1,082	508	508	329	4,075	2,240	2,510	9,070	4,440	3,400
15.....	3,930	3,115	1,486	554	508	286	3,400	2,240	2,600	15,530	5,385	3,200
16.....	3,780	2,935	1,800	554	462	286	3,200	2,240	3,200	15,720	5,385	7,615
17.....	4,230	1,694	1,434	508	742	286	3,200	2,700	2,800	12,490	4,075	4,440
18.....	7,590	1,590	1,331	508	984	246	3,100	5,240	3,300	9,070	3,615	4,075
19.....	5,480	1,486	1,280	508	694	246	2,800	4,315	6,620	5,240	3,300	3,400
20.....	5,480	1,486	1,280	462	647	246	2,800	4,075	5,675	4,825	3,200	3,000
21.....	4,840	1,382	1,230	462	600	208	2,700	4,190	4,825	4,315	3,000	3,000
22.....	4,530	1,382	1,180	417	554	329	2,600	3,075	3,730	4,075	2,800	2,800
23.....	4,230	1,230	1,180	417	508	329	2,600	3,075	3,730	4,075	2,800	2,800
24.....	3,930	1,180	1,082	417	508	372	2,510	2,900	4,440	3,400	2,700	2,510
25.....	3,930	1,180	1,082	462	329	384	2,510	2,900	4,440	3,400	2,700	2,510
26.....	3,220	1,486	984	462	329	984	2,510	3,000	5,675	3,200	3,000	2,330
27.....	3,080	1,486	984	462	329	984	2,510	3,000	5,675	3,200	3,000	2,330
28.....	3,080	1,486	984	508	286	1,131	2,510	5,675	3,845	3,100	3,000	2,240
29.....	2,940	1,486	1,033	600	286	1,280	2,510	5,675	3,400	3,000	3,000	2,150
30.....	2,940	1,434	1,033	554	246	1,280	2,420	4,190	3,100	2,900	4,835	2,070
31.....	2,940	.....	838	.....	329	.....	2,420	4,075	.....	2,800	.....	1,910
Maximum.....	7,930	3,220	1,800	790	984	1,280	5,675	5,675	6,620	15,720	7,615	10,590
Minimum.....	2,940	1,180	838	417	246	208	2,420	2,070	2,240	2,420	2,700	1,910
Mean.....	4,555	2,242	1,211	572	472	431	3,520	3,083	3,516	4,977	3,949	4,052

NOTE.—Daily discharge determined from fairly-defined curves. Daily discharges for April, May, and June are unreliable.

*Daily and monthly discharges, in liters per second, of Quinali River near Kanoo, Guinobatan, Albay, for the year 1921*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	1,910	5,675	4,270	3,000	1,735	1,555	2,910	3,000	5,850	4,190	8,560	8,145
2.....	2,420	3,200	3,940	2,910	1,675	1,555	2,820	3,000	4,080	4,190	12,380	6,460
3.....	2,240	2,700	3,695	2,820	1,675	1,555	9,920	3,000	3,680	4,190	11,880	6,460
4.....	2,070	2,510	3,480	2,735	1,615	1,735	33,700	4,270	3,500	4,190	9,000	6,000
5.....	1,910	2,330	4,150	2,655	1,615	1,735	16,370	3,805	3,410	4,080	9,000	8,560
6.....	1,510	2,240	16,490	2,615	1,615	2,125	8,200	3,000	4,850	3,980	6,000	6,000
7.....	1,590	2,240	27,530	2,575	1,675	1,735	4,930	2,820	5,420	3,880	7,340	5,560
8.....	1,590	2,240	7,920	2,575	1,615	6,470	4,270	2,735	4,650	3,780	7,740	5,290
9.....	1,510	5,230	6,270	2,495	1,555	7,920	4,030	21,290	3,880	3,680	13,880	5,160
10.....	1,440	4,030	5,230	2,495	1,555	4,790	3,585	6,910	3,590	3,590	30,380	4,770
11.....	1,410	3,480	4,650	2,415	1,675	3,585	3,380	3,695	7,740	3,980	20,380	4,770
12.....	1,370	3,380	4,620	2,415	1,735	3,090	3,280	3,380	24,130	3,980	13,880	4,650
13.....	1,370	3,380	4,390	2,340	1,735	2,820	3,585	3,090	10,880	3,780	10,880	4,770
14.....	1,440	3,695	4,030	2,340	1,675	3,805	3,695	2,910	5,850	3,680	9,000	9,440
15.....	1,910	3,380	3,920	2,265	1,675	3,480	3,090	2,655	4,530	3,590	6,980	8,145
16.....	7,440	3,180	3,920	2,195	1,675	3,820	3,280	2,495	4,190	3,590	6,630	5,290
17.....	2,800	2,820	3,805	2,195	1,675	2,820	3,090	2,495	3,980	3,500	6,900	5,160
18.....	2,240	2,820	3,695	2,195	1,855	2,575	3,905	2,415	3,880	3,410	5,850	4,900
19.....	2,150	2,735	19,130	2,265	1,855	2,495	2,820	2,265	4,080	3,410	5,850	7,740
20.....	1,880	8,520	7,920	2,195	2,340	2,820	4,030	2,265	4,080	3,410	5,850	5,160
21.....	1,770	21,770	5,080	2,195	2,195	2,820	4,270	2,195	4,080	3,410	5,850	5,160
22.....	2,330	17,450	3,805	2,195	2,125	2,655	7,150	2,125	3,980	3,410	13,130	5,080
23.....	2,070	5,230	3,585	2,195	1,985	2,575	9,190	2,125	4,190	3,410	16,130	4,770
24.....	1,990	4,270	3,380	2,125	1,855	2,495	5,270	1,920	4,410	3,410	16,130	4,770
25.....	1,750	6,390	3,230	2,055	1,795	2,495	5,890	2,910	6,460	3,590	24,880	5,420
26.....	1,590	6,590	3,180	1,820	1,795	2,495	4,650	3,000	5,420	4,530	14,880	6,000
27.....	1,440	5,550	3,090	1,855	1,795	2,415	3,595	2,820	5,460	3,980	10,630	4,900
28.....	2,240	4,790	3,000	1,855	1,735	3,585	3,380	2,655	5,560	3,780	9,440	4,650
29.....	3,730	.....	3,000	1,795	1,675	3,280	3,130	3,090	4,530	3,590	5,560	4,630
30.....	8,320	.....	3,000	1,795	1,615	3,090	3,000	3,695	4,410	4,880	7,740	4,630
31.....	5,675	.....	3,180	.....	1,555	.....	3,000	6,300	.....	4,650	.....	.....
Maximum.	8,320	21,770	27,530	3,000	2,340	7,920	33,700	21,290	24,130	4,650	30,380	9,440
Minimum.	2,420	2,240	3,000	1,735	1,555	1,555	2,820	2,820	3,410	3,325	3,325	4,530
Mean.	3,421	5,033	5,630	2,321	1,755	3,236	5,791	3,698	5,941	3,807	11,824	5,126

NOTE.—Discharge determined from rating curves, applicable as follows: February 9, 1921, to August 30, 1921, well-defined below 19,000 second-liters; August 31, 1921, to November 5, 1922, fairly well-defined below 12,000 second-liters.



Daily and monthly discharges, in liters per second, of Quinali River near Banao, Guinobatan, Albay, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	4,410	3,590	3,410	2,940	2,670	2,135	2,940	9,440	2,550	3,410	2,940	7,540
2.....	4,410	5,030	3,325	2,940	2,550	2,050	3,085	5,700	2,570	3,245	2,800	6,580
3.....	4,300	4,410	3,245	2,735	2,670	2,050	3,085	3,880	3,590	3,410	2,980	5,690
4.....	4,190	4,080	3,165	2,670	2,550	1,970	3,010	3,325	3,410	3,880	13,680	11,920
5.....	3,880	3,980	2,940	2,610	2,550	2,610	2,940	6,460	3,085	3,880	12,980	8,060
6.....	3,880	3,980	2,870	2,610	2,440	2,230	3,325	6,000	2,800	3,780	7,290	8,060
7.....	4,190	3,780	2,870	2,550	2,330	2,180	3,590	6,000	2,800	3,780	5,600	6,160
8.....	4,080	3,780	2,940	2,550	2,330	2,135	3,560	5,420	2,670	4,190	5,100	5,160
9.....	3,980	3,780	2,870	2,670	2,550	2,050	3,085	4,300	4,650	4,300	4,950	5,100
10.....	3,780	3,780	3,085	2,670	2,550	2,050	12,350	3,680	3,980	4,300	4,660	4,800
11.....	3,680	3,680	2,870	2,650	2,280	1,970	3,085	3,780	3,325	4,190	4,260	4,520
12.....	11,680	3,590	2,940	2,670	2,180	2,010	3,085	3,590	3,780	4,650	4,020	4,800
13.....	6,800	3,410	2,870	2,670	2,135	1,970	3,590	3,325	3,590	6,150	4,660	4,260
14.....	4,900	3,590	2,940	2,670	2,230	1,970	3,590	3,590	3,165	4,530	4,800	3,910
15.....	6,160	3,590	2,940	2,610	2,135	1,970	3,780	4,900	2,940	4,900	4,660	3,800
16.....	6,700	3,590	3,325	2,670	2,050	1,970	3,410	5,700	2,940	5,160	6,160	7,020
17.....	4,410	3,590	3,085	2,670	2,050	2,090	3,085	4,850	4,530	3,580	4,750	6,160
18.....	4,190	3,590	3,085	2,550	2,090	2,090	3,085	4,850	4,530	3,580	3,800	6,160
19.....	4,190	3,590	2,940	2,440	2,090	2,135	4,410	3,780	3,680	3,980	3,910	24,950
20.....	4,080	3,780	2,870	2,550	2,280	2,010	4,650	3,245	3,010	3,410	22,930	61,310
21.....	4,530	3,590	2,735	2,670	3,590	1,970	5,160	3,010	2,800	3,410	22,930	61,310
22.....	4,190	3,410	2,800	2,550	3,245	2,440	6,300	2,870	7,740	3,165	9,570	11,940
23.....	4,080	3,410	2,800	2,550	3,245	2,440	9,220	2,800	5,700	2,940	7,040	7,800
24.....	3,980	3,410	2,870	2,550	2,385	2,230	6,000	2,800	5,700	3,410	5,780	9,570
25.....	3,780	3,410	2,735	2,610	2,330	2,050	4,410	2,800	4,300	3,085	4,950	8,930
26.....	3,780	3,410	2,940	2,870	2,230	2,050	3,780	2,670	4,410	3,245	4,520	7,040
27.....	4,650	3,410	4,300	2,670	2,180	2,050	3,410	2,670	5,030	3,590	38,080	15,080
28.....	3,980	3,325	3,085	2,550	2,180	1,970	3,880	2,550	4,410	3,590	17,980	7,540
29.....	3,780	2,940	2,940	2,670	2,135	1,970	3,245	2,440	3,680	3,590	23,940	5,960
30.....	3,680	2,940	2,940	2,670	2,050	3,780	3,245	2,440	3,590	3,590	11,450	6,580
31.....	3,590	...	2,870	...	2,090	...	13,680	2,550	...	3,085	...	12,870
Maximum.....	11,680	5,030	4,300	2,940	4,530	3,780	19,880	9,440	7,740	6,150	38,080	61,310
Minimum.....	3,590	3,325	2,735	2,440	2,050	1,980	2,940	2,440	2,550	2,940	2,800	2,800
Mean.....	4,601	3,709	3,021	2,639	2,481	2,136	4,591	4,058	3,839	3,853	3,489	3,454

NOTE.—Discharge determined from fairly well-defined rating curve below 30,000 second-liters which is applicable from November 6, 1922, to December 31, 1922. See also footnote to daily discharge for 1921.

## ALBAY PROVINCE

## QUINALI RIVER, MALINAO

LOCATION.—About 2 km. northwest of barrio Parapoto and about 600 m. upstream from barrio of Ogob.

RECORDS AVAILABLE.—From April 1, 1919, to December 31, 1922. Also from April 2, 1911, to April 20, 1912, inclusive, at old location a short distance below present station.

GAGE.—Standard metric gage board horizontally fastened to a tree and a chain with weight.

DISCHARGE MEASUREMENT.—Made by wading at 6.5 m. above gage.

CHANNEL AND BANKS.—Channel straight for 45 m. above and 40 m. below; banks high and not subject to overflow. At measuring section stream bed consists of gravel and small boulders. Rather shifting. Uniformity of flow slightly affected by few boulders.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 110,400 second-liters on July 31, 1922. Minimum discharge, 4,820 second-liters on July 21–24, July 30 to August 1, and August 12, 1920.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge from April 22, 1919, to December 31, 1922, determined from fairly well-defined rating curves.

From April 1, 1911, to April 20, 1912, from a poorly defined curve. Gage read twice daily.

*Discharge measurements of Quinali River, near Ogob, Malinao, Albay*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1911</b>				
April 1 . . . . .	Demers and Laurence.	70	13,240	
April 18 . . . . .	do.	70	11,200	
April 24 . . . . .	do.	72	10,550	
May 1 . . . . .	do.	71	8,670	
May 13 . . . . .	do.	70	10,550	
May 31 . . . . .	do.	68	9,370	
June 13 . . . . .	do.	68	8,110	
June 15 . . . . .	do.	67	8,670	
June 24 . . . . .	do.	66	7,750	
June 28 . . . . .	do.	67	8,500	
July 17 . . . . .	do.	77	16,370	
July 26 . . . . .	do.	73	10,400	
August 8 . . . . .	do.	68	9,930	
August 22 . . . . .	do.	67	10,000	
September 9 . . . . .	do.	67	9,660	
September 21 . . . . .	do.	71	8,710	
October 6 . . . . .	do.	66	6,740	
October 20 . . . . .	do.	66	6,520	
December 8 . . . . .	do.	64	7,370	
December 18 . . . . .	do.	67	7,930	
December 29 . . . . .	do.	63	7,720	
<b>1912</b>				
January 5 . . . . .	do.	67	7,860	
January 17 . . . . .	do.	66	7,700	
February 12 . . . . .	do.	66	9,340	
February 28 . . . . .	do.	70	10,310	
March 7 . . . . .	do.	68	9,890	
March 12 . . . . .	do.	66	7,210	
April 8 . . . . .	do.	66	6,590	

*Discharge measurements of Quinali River, near Ogob, Malinao, Albay—Ctd.*

Date	Made by—	Gage height (meters)	Discharge (second- liters)	Remarks
<b>1919</b>				
March 25 . . . . .	Angel Fegarido..	.37	6,700	
March 29 . . . . .	do.	.36	8,050	
April 22 . . . . .	do.	.35	6,300	
May 18 . . . . .	do.	.33	5,880	
May 14 . . . . .	do.	.33	5,850	
May 21 . . . . .	do.	.31	5,620	
June 4 . . . . .	do.	.32	5,670	
July 24 . . . . .	do.	.38	8,220	
August 21 . . . . .	M. Canas and A. Fega- rido.	.42	7,880	
September 2 . . . . .	A. Fegarido..	.40	8,260	
October 7 . . . . .	do.	.42	8,570	
October 14 . . . . .	do.	.81	16,130	
October 27 . . . . .	do.	.44	9,470	
November 7 . . . . .	A. Fegarido and M. Ca- nas.	.60	14,130	
November 29 . . . . .	do.	.52	10,000	
December 13 . . . . .	do.	.54	10,170	
<b>1920</b>				
January 8 . . . . .	M. B. Canas..	.59	11,910	
January 13 . . . . .	do.	.64	13,860	
February 20 . . . . .	do.	.56	10,410	
March 4 . . . . .	do.	.55	9,960	
March 22 . . . . .	do.	.52	8,740	
March 22 . . . . .	do.	.52	10,950	
March 23 . . . . .	do.	.52	8,670	
April 26 . . . . .	do.	.50	11,370	
May 22 . . . . .	do.	.48	10,220	
June 3 . . . . .	do.	.47	8,880	
June 22 . . . . .	do.	.46	9,240	
July 19 . . . . .	do.	.58	7,150	
August 2 . . . . .	O. Buenaventura	.45	5,059	
August 14 . . . . .	do.	.45	5,025	
September 2 . . . . .	do.	.46	5,233	
September 16 . . . . .	do.	.45	5,039	
October 2 . . . . .	do.	.49	5,919	
October 19 . . . . .	do.	.56	7,136	
November 2 . . . . .	do.	.52	6,654	
November 16 . . . . .	do.	.64	9,608	
December 1 . . . . .	do.	.80	14,832	
December 15 . . . . .	do.	.62	8,815	
<b>1921</b>				
January 20 . . . . .	do.	.60	8,165	
February 4 . . . . .	do.	.70	13,435	
February 19 . . . . .	do.	.69	12,305	
March 19 . . . . .	do.	.82	18,487	
April 4 . . . . .	do.	.65	10,188	
April 20 . . . . .	do.	.56	7,355	
May 2 . . . . .	do.	.58	7,841	
May 9 . . . . .	do.	.59	8,196	
June 4 . . . . .	do.	.57	7,667	
July 7 . . . . .	do.	.64	8,233	
July 28 . . . . .	do.	.60	7,837	
August 26 . . . . .	do.	.57	7,227	
September 3 . . . . .	do.	.59	7,751	
September 19 . . . . .	do.	.60	8,174	
October 3 . . . . .	do.	.59	7,920	
October 13 . . . . .	do.	.67	11,090	
November 5 . . . . .	do.	.84	18,806	
December 3 . . . . .	S. Musa..	.68	11,749	
December 22 . . . . .	O. Buenaventura	.82	17,371	
<b>1922</b>				
January 2 . . . . .	do.	.75	15,065	
January 31 . . . . .	S. Musa..	.72	10,783	
February 21 . . . . .	O. Buenaventura	.74	13,898	
March 6 . . . . .	do.	.71	9,677	
March 22 . . . . .	do.	.70	11,981	
April 1 . . . . .	do.	.70	10,429	
April 18 . . . . .	do.	.71	10,624	
May 2 . . . . .	do.	.67	9,338	

*Discharge measurements of Quinali River, near Ogob, Malinao, Albay—Ctd.*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1922</b>				
May 11.	O. Buenaventura.	66	8,586	.....
May 22 .. .	do	69	11,690	.....
June 1. . .	do	65	8,245	.....
June 9. . .	W. Demers and O. Buenaventura	65	8,371	.....
June 22 . .	S. Musa and O Buenaventura	65	8,241	.....
July 3 ..	do	66	10,355	.....
August 3 ..	O. Buenaventura.. .	75	9,281	.....
August 26 .	do	67	5,040	.....
September 16 . . .	do	64	4,857	.....
October 7 . . . .	do . . . .	68	7,365	.....
October 23. . . .	do . . . .	66	6,885	.....
November 14 . .	do.	74	9,009	.....
December 11 . .	do	79	9,481	.....
December 20 . .	do	77	9,339	.....

NOTE.—Gage-height readings from March 25, 1919, referred to different data.

Daily and monthly discharges, in liters per second, of Quinali River near Ogob, Malinao, Albay, for the year 1911

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	.....	.....	.....	.....	10,120	8,320	55,720	11,320	7,720	8,320	9,520	10,120
2	.....	.....	.....	10,120	11,920	7,720	7,720	11,320	7,720	8,320	9,520	8,920
3	.....	.....	.....	10,120	11,320	7,720	14,320	10,120	7,720	8,320	9,520	7,130
4	.....	.....	.....	10,720	10,720	7,720	12,520	10,120	7,720	8,320	8,920	7,130
5	.....	.....	.....	10,120	11,320	8,320	11,920	10,120	8,320	7,720	8,920	7,130
6	.....	.....	.....	11,320	10,720	8,920	10,120	10,120	7,720	7,720	10,120	6,550
7	.....	.....	.....	10,720	14,920	8,320	10,120	10,120	7,720	7,720	8,920	6,550
8	.....	.....	.....	11,920	13,720	10,720	10,120	8,920	7,720	7,720	8,920	6,550
9	.....	.....	.....	28,120	11,320	8,320	10,120	8,920	7,720	7,720	8,920	6,550
10	.....	.....	.....	17,320	11,320	6,550	14,320	8,920	8,920	7,720	8,920	6,550
11	.....	.....	.....	17,320	10,120	8,320	14,320	8,920	8,920	7,720	8,920	6,550
12	.....	.....	.....	17,520	10,120	9,520	29,920	8,920	7,720	7,720	8,320	7,130
13	.....	.....	.....	11,320	10,120	8,920	28,120	8,920	8,320	8,320	8,920	6,550
14	.....	.....	.....	10,720	9,520	8,920	19,120	8,920	8,320	8,320	8,920	6,550
15	.....	.....	.....	11,320	10,120	8,920	16,720	8,320	8,920	7,720	9,520	7,130
16	.....	.....	.....	11,320	8,920	8,920	14,320	8,920	8,920	7,720	9,520	10,720
17	.....	.....	.....	11,920	8,920	8,920	14,320	11,920	10,120	8,920	8,320	9,520
18	.....	.....	.....	12,520	8,920	9,520	14,320	8,920	10,120	8,920	8,320	8,320
19	.....	.....	.....	12,520	8,920	9,520	13,120	8,920	10,120	7,720	9,520	7,720
20	.....	.....	.....	11,320	10,720	8,920	13,120	10,720	10,720	7,720	8,920	11,920
21	.....	.....	.....	11,320	8,920	7,720	13,120	9,520	10,720	7,720	8,320	8,920
22	.....	.....	.....	11,320	8,920	8,320	12,520	8,920	10,120	7,720	7,720	8,920
23	.....	.....	.....	13,720	8,920	7,720	13,720	13,720	10,120	7,720	7,720	8,920
24	.....	.....	.....	11,320	7,720	7,720	12,520	10,120	8,620	7,720	8,320	7,720
25	.....	.....	.....	10,320	8,720	7,720	12,520	18,920	8,620	7,720	8,320	7,130
26	.....	.....	.....	10,720	8,320	8,920	11,320	8,920	8,920	7,720	7,720	7,130
27	.....	.....	.....	10,720	8,320	8,320	12,520	8,920	7,720	8,320	7,130	6,550
28	.....	.....	.....	12,520	8,920	8,920	11,320	8,920	7,720	10,120	7,130	7,130
29	.....	.....	.....	11,320	8,920	8,920	12,520	7,720	8,920	10,120	10,120	6,550
30	.....	.....	.....	.....	8,320	8,920	12,520	7,720	7,720	9,520	.....	6,550
31	.....	.....	.....	.....	8,320	.....	11,320	8,320	.....	.....	.....	.....
Maximum	.....	.....	.....	28,120	14,920	10,720	55,720	13,720	10,720	10,120	10,120	11,920
Minimum	.....	.....	.....	10,120	7,720	7,720	10,120	7,720	7,720	7,130	7,130	6,550
Mean	.....	.....	.....	11,763	9,946	8,600	15,249	9,559	8,780	7,917	8,701	7,675

NOTE.—Discharge determined from a poorly defined rating curve, applicable from April 1, 1911, to April 20, 1912.

*Daily and monthly discharges, in liters per second, of Quinali River near Ogob, Malinao, Albay, for the year 1912*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	5,980	7,720	8,920	10,720								
2.....	5,980	7,720	8,920	10,120								
3.....	6,550	8,920	8,920	9,520								
4.....	7,130	7,720	8,920	7,720								
5.....	10,120	15,520	8,920	7,130								
6.....	7,720	8,920	8,920	7,130								
7.....	7,720	7,720	8,920	7,720								
8.....	7,130	7,720	8,920	7,720								
9.....	7,130	6,550	8,920	7,720								
10.....	6,550	7,130	7,720	7,720								
11.....	21,520	7,720	7,720	8,320								
12.....	14,320	7,720	7,720	8,920								
13.....	9,520	7,130	7,720	8,920								
14.....	8,920	7,130	7,720	8,920								
15.....	7,720	7,130	7,720	8,320								
16.....	7,720	8,920	7,720	8,320								
17.....	6,550	7,720	7,720	7,720								
18.....	6,550	7,720	8,320	7,720								
19.....	6,550	7,720	8,320	7,720								
20.....	6,550	19,720	8,320	8,920								
21.....	7,720	39,520	8,320									
22.....	7,720	17,920	7,720									
23.....	7,720	13,120	8,320									
24.....	7,720	13,720	7,720									
25.....	7,720	11,320	8,320									
26.....	7,720	11,320	8,920									
27.....	7,720	15,520	8,320									
28.....	8,920	10,120	8,320									
29.....	8,920	9,520	9,520									
30.....	7,720		11,920									
31.....	7,720		11,320									
Maximum.....	21,520	39,520	11,920	10,720								
Minimum.....	5,980	6,550	7,720	7,130								
Mean.....	8,234	10,909	8,572	8,351								

NOTE.—Discharge determined from a poorly defined rating curve, applicable from April, 1911, to April 20, 1912.

Daily and monthly discharges, in liters per second, of Quinali River near Ogob, Malinao, Albay, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.				6,910	5,780	5,945	8,430	6,500	7,625	7,625	22,150	14,120
2.				7,140	5,780	5,945	8,430	6,500	7,380	7,625	13,670	12,880
3.				7,140	5,780	5,945	7,625	6,500	7,380	7,380	12,830	12,425
4.				7,140	5,780	5,945	6,700	6,500	7,140	7,380	12,040	23,890
5.				7,140	6,300	5,945	6,700	6,500	7,140	8,150	18,130	18,130
6.				7,140	6,300	5,945	6,700	6,500	6,910	7,380	16,030	16,060
7.				7,140	6,300	5,945	6,700	6,500	6,910	7,380	16,030	16,060
8.				7,140	6,300	5,945	6,500	6,700	6,910	7,380	12,830	12,830
9.				7,140	5,945	6,910	6,500	6,700	7,140	8,430	12,425	12,425
10.				7,140	5,945	6,910	6,500	7,380	7,380	6,910	12,040	12,040
11.				6,700	5,945	6,910	6,500	7,140	9,000	6,910	11,660	11,660
12.				7,140	5,945	6,700	6,500	7,880	9,620	8,150	10,250	11,660
13.				7,140	5,945	6,700	6,500	7,880	18,130	7,880	11,660	12,040
14.				7,140	5,945	6,500	6,700	7,625	8,710	10,940	13,250	12,040
15.				7,140	5,945	5,945	6,500	6,910	8,150	10,940	14,120	12,040
16.				6,700	5,945	5,945	6,500	6,910	8,430	9,620	14,120	11,660
17.				7,140	5,945	5,945	6,500	6,910	32,590	8,430	48,250	13,250
18.				7,140	5,945	5,945	6,500	6,910	11,290	8,430	28,530	15,050
19.				7,140	5,945	5,945	6,500	7,380	9,930	8,430	18,670	23,890
20.				6,700	5,945	5,945	6,910	9,620	9,310	8,430	14,120	15,050
21.				7,140	5,945	5,945	6,700	7,880	8,430	7,880	14,120	13,250
22.				6,300	5,945	5,945	6,910	7,380	8,430	7,880	13,670	12,830
23.				6,300	5,945	5,945	6,700	7,380	8,150	7,880	12,830	12,425
24.				6,300	5,945	5,945	6,500	7,380	7,880	8,710	12,830	12,040
25.				6,300	5,945	5,945	6,500	7,380	7,380	16,550	11,660	11,660
26.				6,300	5,945	5,945	6,500	6,500	7,380	8,710	14,550	11,660
27.				6,300	5,945	6,700	6,700	6,910	7,380	8,710	16,030	11,660
28.				6,300	5,945	6,910	6,910	6,910	7,140	8,710	15,050	11,660
29.				6,300	5,945	6,300	7,625	7,625	7,140	8,710	15,050	11,660
30.				6,300	5,945	5,945	6,910	6,620	7,140	24,470	12,830	19,250
31.				6,300	5,945	5,945	6,700	8,150	.....	12,040	.....	15,540
Maximum				7,140	6,300	7,880	8,430	9,620	32,590	24,470	48,250	23,890
Minimum				6,300	5,780	5,945	5,945	6,500	6,910	6,910	10,250	11,290
Mean				6,836	5,970	6,232	6,832	7,483	9,118	9,277	16,042	13,838

Note.—Discharge determined from a rating curve fairly well-defined between 5,500 and 15,000 second-liters, applicable from April 1, 1919, to February 14, 1920.

Daily and monthly discharges, in liters per second, of Quinali River near Ogob, Malinao, Albay, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	12,830	10,590	7,610	6,370	5,900	5,540	5,670	4,820	5,230	5,450	6,370	15,380
2.....	13,250	10,590	7,100	6,370	5,900	5,450	5,670	5,025	5,230	5,450	6,610	11,985
3.....	12,425	10,590	7,100	6,370	5,670	5,450	5,450	5,025	5,230	5,670	11,030	10,715
4.....	13,670	10,590	7,950	6,610	5,670	5,450	5,450	5,025	5,230	5,450	11,030	10,125
5.....	13,670	10,840	7,100	6,370	5,670	5,450	5,450	5,025	5,230	5,450	8,960	12,980
6.....	16,550	10,250	7,100	6,370	5,670	5,450	5,450	5,025	5,230	5,450	8,410	12,320
7.....	16,550	10,590	6,610	6,370	5,670	5,450	5,450	5,025	5,230	5,450	8,410	13,310
8.....	12,825	10,260	6,610	6,370	5,670	5,450	5,450	5,025	5,230	5,450	8,410	16,070
9.....	13,250	10,590	6,610	6,370	5,670	5,450	5,450	5,025	5,230	5,450	7,610	11,660
10.....	12,040	10,250	6,610	6,370	5,670	5,450	5,450	5,025	5,230	5,450	7,610	11,660
11.....	12,830	10,590	6,610	6,370	5,670	5,450	5,450	5,025	5,230	5,450	7,610	10,125
12.....	15,540	10,250	6,610	6,370	5,670	5,450	5,450	5,025	5,230	5,450	7,610	9,880
13.....	16,030	10,250	6,610	6,370	5,670	5,450	5,450	5,025	5,230	5,450	7,610	9,880
14.....	14,580	10,250	6,370	6,130	5,670	5,450	5,450	5,025	5,230	5,450	8,410	9,535
15.....	15,050	10,420	6,370	6,130	5,670	5,450	5,450	5,025	5,230	5,450	9,240	9,535
16.....	14,120	9,240	6,370	6,130	5,670	5,450	5,450	5,025	5,230	5,450	9,240	9,535
17.....	19,250	9,240	6,610	5,900	5,670	5,450	5,450	5,025	5,230	5,450	9,240	11,660
18.....	15,540	8,580	6,610	5,900	5,670	5,450	5,450	5,025	5,230	5,450	9,240	11,030
19.....	14,120	8,140	6,610	5,900	5,670	5,450	5,450	5,025	5,230	5,450	9,240	10,125
20.....	12,830	7,610	6,610	6,130	5,670	5,450	5,450	5,025	5,230	5,450	9,240	9,240
21.....	12,425	7,610	6,610	6,130	5,670	5,450	5,450	5,025	5,230	5,450	9,240	9,240
22.....	11,660	7,100	6,610	6,130	5,670	5,450	5,450	5,025	5,230	5,450	9,240	9,240
23.....	11,660	7,100	6,610	6,130	5,670	5,450	5,450	5,025	5,230	5,450	9,240	9,240
24.....	12,040	7,350	6,370	6,130	5,670	5,450	5,450	5,025	5,230	5,450	9,240	9,240
25.....	11,660	7,610	7,100	6,130	5,670	5,450	5,450	5,025	5,230	5,450	9,240	9,240
26.....	11,290	7,870	7,100	6,130	5,670	5,450	5,450	5,025	5,230	5,450	9,240	9,240
27.....	11,290	8,680	7,100	6,130	5,670	5,450	5,450	5,025	5,230	5,450	9,240	9,240
28.....	10,940	7,870	6,610	6,130	5,670	5,450	5,450	5,025	5,230	5,450	9,240	9,240
29.....	11,290	7,610	6,610	6,130	5,670	5,450	5,450	5,025	5,230	5,450	9,240	9,240
30.....	10,940	.....	6,610	6,130	5,670	5,450	5,450	5,025	5,230	5,450	9,240	9,240
31.....	10,940	.....	6,610	6,130	5,670	5,450	5,450	5,025	5,230	5,450	9,240	9,240
Maximum.....	16,550	10,940	7,610	6,850	6,130	6,130	5,670	5,450	5,450	5,450	11,030	16,070
Minimum.....	10,940	7,100	6,370	5,900	5,230	5,230	4,820	4,820	4,820	4,820	6,370	8,410
Mean.....	13,312	9,306	6,754	6,325	5,657	5,326	5,211	5,099	5,431	5,318	8,587	10,380

Note.—Daily discharge determined from a fairly well-defined curve from 5,000 to 9,000 second-liters, applicable from February 15 to December 31, 1921.



Daily and monthly discharges, in liters per second, of Quinali River near Ogob, Malinao, Albay, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	9,400	21,740	17,500	11,460	8,200	7,810	7,420	7,810	8,600	8,600	15,070	18,520
2.....	11,900	14,500	15,540	11,030	8,200	7,810	7,420	7,810	8,600	8,600	26,360	18,000
3.....	9,400	12,340	14,600	10,600	8,200	7,810	7,420	7,810	8,200	8,600	20,100	18,000
4.....	9,400	12,780	14,130	10,200	7,810	7,420	21,660	7,810	8,200	8,600	24,000	18,000
5.....	10,600	11,030	13,660	11,030	7,810	7,810	19,560	7,810	8,600	8,600	20,640	18,520
6.....	8,600	11,030	20,640	11,460	7,810	7,810	14,660	7,810	8,600	8,600	21,740	19,040
7.....	8,600	13,660	30,060	10,200	7,810	7,420	9,800	7,420	8,200	8,600	24,000	18,520
8.....	8,600	13,660	18,560	8,600	7,810	7,420	8,600	7,420	8,200	8,600	43,400	17,500
9.....	8,600	16,300	13,660	8,600	7,810	7,420	8,600	8,200	8,200	8,600	43,400	17,500
10.....	8,600	11,030	17,500	10,600	8,200	7,420	8,600	8,200	9,000	9,400	39,200	16,500
11.....	8,600	10,600	15,540	10,200	8,200	7,810	8,600	7,810	16,500	9,400	39,200	16,500
12.....	8,600	10,600	14,130	9,400	7,810	7,810	8,200	7,810	14,600	11,030	27,560	17,500
13.....	8,600	16,500	14,130	8,600	7,810	7,810	8,600	7,810	10,600	10,600	22,300	20,100
14.....	8,600	20,640	14,130	8,600	8,200	7,810	8,600	7,810	9,400	14,600	20,640	18,520
15.....	8,600	12,340	16,500	8,200	8,600	8,600	8,200	7,810	9,400	11,900	19,040	17,500
16.....	14,600	11,030	16,500	8,200	8,600	7,810	8,200	7,810	9,000	10,200	18,520	16,500
17.....	11,030	10,600	15,540	8,600	8,200	7,810	9,000	7,810	9,000	9,400	17,500	16,020
18.....	9,400	10,600	15,070	8,600	8,200	7,420	9,000	7,420	8,600	9,400	17,500	16,020
19.....	8,600	19,560	20,100	8,600	7,810	7,420	9,400	7,420	8,600	9,400	17,500	16,020
20.....	8,600	24,580	15,070	8,600	7,810	7,420	9,400	7,420	8,600	9,400	17,500	16,020
21.....	8,200	24,580	13,660	8,600	7,810	7,050	9,400	7,050	8,600	8,600	21,180	18,520
22.....	8,200	29,420	12,780	8,600	8,600	7,420	9,800	7,420	8,600	8,600	27,560	17,000
23.....	10,200	25,160	11,900	9,400	8,200	7,420	9,800	7,810	8,600	10,200	28,180	16,500
24.....	9,800	18,000	10,600	8,600	7,810	7,810	9,400	7,810	8,600	10,200	21,740	16,500
25.....	8,600	34,540	10,200	8,600	7,810	7,810	9,400	7,810	8,600	11,030	52,690	31,000
26.....	8,600	24,580	9,800	8,600	7,810	7,420	8,600	7,810	8,600	11,460	32,000	45,300
27.....	8,600	20,640	11,900	8,600	7,810	7,810	8,600	7,810	9,400	11,030	25,760	32,900
28.....	8,600	19,040	11,030	8,200	7,810	8,200	8,600	7,420	9,000	13,220	20,640	25,500
29.....	11,030	.....	11,900	8,200	7,420	7,810	8,200	7,420	9,000	11,030	19,560	22,140
30.....	14,600	.....	12,780	8,200	7,810	7,420	8,200	7,810	9,000	11,030	18,520	20,560
31.....	15,540	.....	11,900	8,200	7,810	.....	7,810	7,420	.....	15,540	.....	25,500
Maximum.....	15,540	34,540	30,060	11,460	8,600	8,600	21,740	8,200	16,500	15,540	52,690	45,300
Minimum.....	8,200	9,400	9,800	8,200	7,420	7,050	7,420	7,050	8,200	8,200	15,070	16,020
Mean.....	9,693	16,535	15,046	9,259	8,000	7,630	9,891	7,698	9,190	10,118	26,084	20,153

NOTE.—Discharge determined from fairly well-defined rating curve below 52,700 second-liters, applicable from January 1 to December 24, 1921.

Daily and monthly discharges, in liters per second, of Quinali River near Ogob, Malinao, Albay, for the year 1922.

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	19,060	17,640	11,650	9,660	7,050	5,550	4,850	45,300	5,550	8,720	9,660	32,900
2	19,060	39,000	11,650	9,660	6,300	6,300	4,850	25,500	6,300	7,850	9,660	31,000
3	17,640	29,150	11,650	9,660	6,300	5,550	4,850	13,840	7,850	7,850	19,060	26,500
4	17,640	23,800	11,650	8,720	6,300	5,550	4,850	10,620	8,720	7,850	7,850	29,150
5	17,640	25,500	10,620	9,660	5,550	6,300	4,850	9,660	7,850	7,850	120,900	36,900
6	19,060	22,140	10,620	9,660	5,550	6,300	4,850	9,660	6,300	8,720	62,100	32,900
7	19,060	22,140	10,620	9,660	7,050	6,300	4,850	9,660	6,300	16,280	25,500	31,000
8	19,060	19,060	9,660	9,660	7,050	6,300	4,850	9,660	8,720	16,280	16,280	25,500
9	16,280	16,280	9,660	9,660	7,050	6,300	4,850	7,850	7,050	12,710	15,010	23,800
10	16,280	16,280	9,660	9,660	6,300	5,550	6,300	8,720	11,650	9,660	16,280	20,560
11	16,280	16,280	9,660	10,620	6,300	5,550	4,850	7,850	11,650	8,720	16,280	23,800
12	29,150	16,280	9,660	11,650	6,300	5,550	4,850	7,850	11,650	7,850	16,280	19,060
13	45,300	16,280	10,620	13,840	6,300	5,550	4,850	8,720	7,850	7,850	13,840	19,060
14	34,850	16,280	10,620	10,620	6,300	5,550	4,850	17,640	4,850	7,850	12,710	17,640
15	49,500	15,010	11,650	10,620	6,300	5,550	4,850	17,640	4,850	10,620	12,710	16,280
16	70,500	15,010	41,100	9,660	6,300	4,850	4,850	13,840	4,850	9,660	11,650	29,150
17	32,900	13,840	22,140	8,720	6,300	4,850	4,850	13,840	4,850	9,660	11,650	32,900
18	29,150	13,840	16,280	9,660	6,300	4,850	5,550	9,660	6,300	11,650	11,650	82,500
19	25,500	13,840	11,650	9,660	6,300	4,850	6,300	9,660	6,300	9,660	11,650	133,500
20	23,800	13,840	11,650	9,660	13,840	4,850	7,050	9,660	6,300	9,660	11,650	146,100
21	22,140	13,840	11,650	7,850	7,850	6,300	7,850	7,850	15,010	8,720	29,300	41,100
22	22,140	12,710	9,660	7,850	7,850	6,300	9,660	7,850	17,640	7,850	13,840	29,060
23	23,800	12,710	9,660	7,850	7,050	5,550	13,840	7,850	17,640	7,850	13,840	29,150
24	20,560	12,710	9,660	7,850	6,300	5,550	13,840	7,050	19,060	7,850	13,840	62,100
25	19,060	12,710	9,660	7,850	6,300	4,850	13,840	7,050	19,060	7,850	13,840	29,150
26	19,060	11,650	259,500	9,660	6,300	4,850	11,650	7,050	17,640	7,850	13,840	29,150
27	20,560	11,650	53,700	7,850	6,300	4,850	9,660	7,050	13,840	7,850	41,100	41,100
28	22,140	11,650	19,060	7,850	6,300	4,850	6,300	6,300	11,650	11,650	91,500	19,060
29	19,060	..	16,280	7,050	6,300	4,850	6,300	6,300	10,620	13,840	116,700	12,710
30	19,060	..	11,650	7,050	6,300	5,550	16,280	6,300	9,660	13,840	45,300	31,000
31	16,280	..	9,660	..	6,300	..	{ 99,900 110,400 }	6,300	..	11,650	..	72,600
Maximum	70,500	39,000	259,500	13,840	13,840	6,300	110,400	45,300	19,060	16,280	120,900	146,100
Minimum	16,280	11,650	9,660	7,050	5,550	4,850	4,850	6,300	4,850	7,850	9,660	12,710
Mean	20,163	17,322	22,896	9,300	6,790	5,517	13,380	11,103	9,720	9,524	32,483	38,242

NOTE.—Discharge determined from fairly well-defined rating curve below 41,000 second-liters, applicable from December 25, 1921, to December 31, 1922.

**ALBAY PROVINCE**  
**QUINALI RIVER, POLANGUI**

**LOCATION.**—About 42 km. from Legaspi on the downstream side of bridge of the Legaspi-Libon Road.

**RECORDS AVAILABLE.**—From February 12, 1919, to December 31, 1922. Also from August 9, 1910, to April 20, 1912, inclusive, at a place very near present station.

**GAGE.**—Standard metric gage board fastened vertically on first pier of bridge at left bank.

**DISCHARGE MEASUREMENTS.**—Made by wading underneath bridge at low water; from bridge at high water.

**CHANNEL AND BANKS.**—Channel straight for over 50 m. above and below the station; both banks low but not subject to overflow. Covered with vegetation. At measuring section stream bed very shifting. Flow fairly uniform.

**EXTREMES OF DISCHARGE.**—Maximum discharge recorded during period of observation, 119,580 second-liters on July 4, 1921. Minimum, 1,700 second-liters, on August 13, 1920.

**DIVERSIONS.**—None.

**REGULATION.**—None.

**UTILIZATION.**—For irrigation purposes.

**ACCURACY.**—Daily discharge from August 9, 1910, to April 20, 1912 determined from a poorly defined rating curve.

Discharge from February 12, 1919, to December 31, 1922, determined from fairly well-defined rating curves, except records from February 25 to May 20, 1922, which were determined from poorly defined rating curve. Gage read twice daily.

*Discharge measurements of Quinali River, near Quinali, Polangui, Albay*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1910</b>				
July 7			7,200	
August 25	J. I. Quinn	1 06	14,090	
August 25	do.	1 04	9,550	
October 18	do	1 04	16,240	
November 21	do.	1 10	18,850	
November 28	do.	1 14	21,390	
December 13	do	1 14	23,780	
<b>1911</b>				
January 13	do.	1 15	27,000	
January 17	do.	1 12	22,760	
January 23	Wilfred Demers.	1 10	15,910	
February 3	do.	1 06	7,160	
February 7	do	1 05	14,300	
February 11	do.	1 10	17,290	
February 18	do.	1 21	18,250	
February 22	do.	1 31	22,490	
March 9	do.	1 08	16,506	
March 31	do.	1 07	12,940	
April 17	do.	1 10	16,460	
May 6	do.	1 13	16,190	
May 25	do.	.98	10,060	
June 10	do.	.96	8,720	
June 22	do.	.99	10,960	
July 10	do.	2 00	111,060	
July 15	do.	1 63	37,940	
July 24	do.	1 22	17,640	
August 7	do.	1 09	11,860	
August 18	do.	1 02	10,150	
September 18	do.	1 08	13,860	
September 23	do.	1 12	14,890	
October 5	do.	1 08	10,080	
October 10	do.	1 08	9,820	
October 28	do.	.99	7,600	

*Discharge measurements of Quinali River, near Quinali, Polangui,  
Albay—Continued*

Date	Made by—	Gage height (meters)	Discharge (second- liters)	Remarks
<b>1911</b>				
December 7. . . . .	Wilfred Demers . . . . .	1 03	9,840	.. . . .
December 9 . . . . .	do . . . . .	1 04	10,040	.. . . .
December 15 . . . . .	do . . . . .	1 04	9,120	.. . . .
December 20 . . . . .	do . . . . .	1 05	9,640	.. . . .
December 27 . . . . .	do . . . . .	1 00	8,400	.. . . .
<b>1912</b>				
January 3 . . . . .	do . . . . .	1 06	10,450	.. . . .
January 6 . . . . .	do . . . . .	1 05	10,080	.. . . .
January 15. . . . .	do . . . . .	1 09	11,530	.. . . .
January 18 . . . . .	do . . . . .	1 07	10,750	.. . . .
January 26 . . . . .	do . . . . .	1 05	9,440	.. . . .
February 8 . . . . .	do . . . . .	1 04	9,780	.. . . .
February 13 . . . . .	do . . . . .	1 05	10,880	.. . . .
February 20 . . . . .	do . . . . .	1 04	8,570	.. . . .
February 27 . . . . .	do . . . . .	1 06	10,700	.. . . .
March 4 . . . . .	do . . . . .	1 03	9,790	.. . . .
March 14 . . . . .	do . . . . .	99	8,290	.. . . .
March 26 . . . . .	do . . . . .	99	8,990	.. . . .
April 6. . . . .	do . . . . .	96	6,870	.. . . .
April 11 . . . . .	do . . . . .	97	6,620	.. . . .
<b>1919</b>				
February 11. . . . .	W. Demers and A. Fega- rido . . . . .	37	12,510	.. . . .
March 1 . . . . .	do . . . . .	35	11,630	.. . . .
March 21 . . . . .	Angel Fegarido . . . . .	30	10,180	.. . . .
April 14 . . . . .	do . . . . .	29	7,630	.. . . .
April 25 . . . . .	do . . . . .	23	6,880	.. . . .
May 8. . . . .	do . . . . .	19	5,200	.. . . .
May 23. . . . .	do . . . . .	20	5,310	.. . . .
June 6. . . . .	do . . . . .	14	3,620	.. . . .
July 21. . . . .	do . . . . .	28	8,980	.. . . .
August 15 . . . . .	do . . . . .	46	13,610	.. . . .
September 5 . . . . .	A. Fegarido and M. B. Canas . . . . .	17	5,260	.. . . .
September 16 . . . . .	do . . . . .	50	15,290	.. . . .
September 24. . . . .	A. Fegarido and M. B. Canas. . . . .	20	5,390	.. . . .
October 8. . . . .	do . . . . .	31	10,480	.. . . .
October 21. . . . .	do . . . . .	54	16,710	.. . . .
November 4 . . . . .	do . . . . .	35	11,730	.. . . .
November 18 . . . . .	do . . . . .	23	6,880	.. . . .
December 2. . . . .	do . . . . .	45	13,550	.. . . .
December 16 . . . . .	do . . . . .	44	12,440	.. . . .
<b>1920</b>				
January 10 . . . . .	M. B. Canas. . . . .	56	20,190	.. . . .
January 15. . . . .	do . . . . .	56	20,260	.. . . .
February 7. . . . .	do . . . . .	41	15,390	.. . . .
March 9. . . . .	do . . . . .	40	4,130	.. . . .
March 16 . . . . .	do . . . . .	38	3,160	.. . . .
March 27. . . . .	do . . . . .	34	2,440	.. . . .
March 29 . . . . .	do . . . . .	32	2,490	.. . . .
April 12. . . . .	do . . . . .	32	2,270	.. . . .
April 13. . . . .	do . . . . .	32	2,270	.. . . .
April 22. . . . .	do . . . . .	16	1,230	.. . . .
May 5. . . . .	do . . . . .	50	5,230	.. . . .
May 18 . . . . .	do . . . . .	20	3,050	.. . . .
June 8. . . . .	do . . . . .	22	2,840	.. . . .
June 17. . . . .	do . . . . .	20	4,370	.. . . .
July 8 . . . . .	do . . . . .	32	4,900	.. . . .
July 21. . . . .	M. B. Canas and O. Buen- aventura . . . . .	28	4,890	.. . . .
July 21. . . . .	do . . . . .	29	4,580	.. . . .
July 29 . . . . .	do . . . . .	29	4,580	.. . . .
August 4. . . . .	O. Buenaventura . . . . .	20	4,253	.. . . .
August 11. . . . .	do . . . . .	21	4,699	.. . . .
August 11. . . . .	do . . . . .	11	2,190	.. . . .
August 17. . . . .	do . . . . .	09	2,141	.. . . .
August 27. . . . .	do . . . . .	35	8,764	.. . . .
September 4 . . . . .	do . . . . .	32	8,147	.. . . .
September 11 . . . . .	do . . . . .	30	7,438	.. . . .
September 17 . . . . .	do . . . . .	28	6,650	.. . . .
September 24. . . . .	do . . . . .	57	21,298	.. . . .
October 7. . . . .	do . . . . .	39	11,594	.. . . .
October 22. . . . .	do . . . . .	56	19,377	.. . . .
November 5. . . . .	do . . . . .	60	23,031	.. . . .

*Discharge measurements of Quinali River, near Quinali, Polangui,  
Albay—Continued*

Date	Made by—	Gage height (meters)	Discharge (second- liters)	Remarks
<b>1920</b>				
November 11.....	O. Buenaventura.....	.39	10,462	
November 20.....	do.....	.40	11,745	
November 26.....	do.....	.42	12,386	
December 3.....	do.....	.60	23,098	
December 11.....	do.....	.48	15,618	
December 22.....	do.....	.50	17,158	
<b>1921</b>				
January 7.....	do.....	.40	9,167	
January 14.....	do.....	.39	8,068	
January 24.....	do.....	.40	8,644	
January 31.....	do.....	.59	16,065	
February 7.....	do.....	.53	17,705	
February 7.....	do.....	.53	12,705	
February 15.....	do.....	.48	11,854	
February 21.....	do.....	.40	9,230	
February 28.....	do.....	.42	10,302	
March 10.....	do.....	1.01	32,930	
March 18.....	do.....	.68	19,566	
March 23.....	do.....	.70	21,405	
March 30.....	do.....	.65	19,996	
April 6.....	do.....	.52	14,764	
April 22.....	do.....	.34	7,458	
April 29.....	do.....	.29	6,344	
May 4.....	do.....	.27	5,839	
May 8.....	do.....	.26	5,840	
June 8.....	O. Buenaventura.....	.30	6,873	
June 29.....	do.....	.28	6,653	
July 11.....	do.....	.44	10,438	
July 26.....	do.....	.39	8,866	
August 5.....	do.....	.40	9,113	
August 22.....	do.....	.29	6,718	
September 6.....	do.....	.49	12,863	
September 16.....	do.....	.59	17,750	
September 21.....	do.....	.46	11,869	
October 5.....	do.....	.48	11,671	
October 11.....	do.....	.50	12,944	
November 3.....	do.....	1.00	34,219	
November 29.....	S. Musa.....	.98	33,106	
December 6.....	do.....	.88	29,235	
December 21.....	O. Buenaventura.....	.79	27,417	
December 23.....	do.....	.75	25,183	
<b>1922</b>				
January 4.....	do.....	.65	19,871	
January 11.....	do.....	.62	17,948	
January 16.....	do.....	.88	28,798	
January 26.....	do.....	.62	18,617	
February 2.....	do.....	.80	25,068	
February 20.....	do.....	.54	13,789	
March 4.....	do.....	.48	16,377	
March 29.....	do.....	.50	16,653	
April 4.....	do.....	.38	10,645	
April 20.....	do.....	.36	9,901	
April 27.....	do.....	.33	8,969	
May 4.....	do.....	.36	8,419	
May 13.....	do.....	.41	11,220	
May 20.....	do.....	.35	6,562	
June 4.....	do.....	.21	3,653	
June 23.....	S. Musa and O. Buena- ventura.....	.46	9,137	
July 5.....	do.....	.43	9,801	
July 15.....	do.....	.33	7,423	
August 10.....	do.....	.60	14,360	
August 25.....	do.....	.38	9,302	
August 28.....	do.....	.36	6,974	
September 15.....	do.....	.36	7,108	
September 19.....	do.....	.62	12,893	
October 5.....	do.....	.50	11,227	
October 10.....	do.....	.47	10,863	
October 21.....	do.....	.52	12,397	
October 24.....	do.....	.48	10,813	
November 13.....	do.....	.65	17,491	
November 27.....	do.....	1.46	53,237	
December 9.....	do.....	.78	26,625	
December 12.....	do.....	.75	25,203	
December 19.....	do.....	.72	21,877	

NOTE.—Gage height readings from February 11, 1919, to April 11, 1922, referred to new data.  
199606—7

*Daily and monthly discharges, in liters per second, of Quinali River near Quinali, Polangui, Albay, for the year 1910*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	.....	.....	.....	.....	.....	.....	.....	.....	7,500	18,400	23,900	14,705
2.....	.....	.....	.....	.....	.....	.....	.....	.....	7,050	16,050	87,400	13,800
3.....	.....	.....	.....	.....	.....	.....	.....	.....	12,900	61,400	41,400	26,900
4.....	.....	.....	.....	.....	.....	.....	.....	.....	30,400	48,400	28,400	36,400
5.....	.....	.....	.....	.....	.....	.....	.....	.....	16,500	24,400	22,900	34,400
6.....	.....	.....	.....	.....	.....	.....	.....	.....	17,400	18,400	18,400	23,400
7.....	.....	.....	.....	.....	.....	.....	.....	.....	9,300	16,950	15,600	19,400
8.....	.....	.....	.....	.....	.....	.....	.....	.....	13,800	16,050	14,700	18,400
9.....	.....	.....	.....	.....	.....	.....	.....	.....	26,400	16,600	12,900	16,500
10.....	.....	.....	.....	.....	.....	.....	.....	.....	2,200	14,700	15,600	12,900
11.....	.....	.....	.....	.....	.....	.....	.....	.....	2,200	12,900	12,000	19,400
12.....	.....	.....	.....	.....	.....	.....	.....	.....	2,550	13,800	12,000	17,400
13.....	.....	.....	.....	.....	.....	.....	.....	.....	11,550	14,700	11,550	15,150
14.....	.....	.....	.....	.....	.....	.....	.....	.....	2,900	10,200	13,350	16,500
15.....	.....	.....	.....	.....	.....	.....	.....	.....	8,400	12,900	23,400	12,900
16.....	.....	.....	.....	.....	.....	.....	.....	.....	3,600	12,000	19,400	17,400
17.....	.....	.....	.....	.....	.....	.....	.....	.....	2,550	22,400	14,250	16,050
18.....	.....	.....	.....	.....	.....	.....	.....	.....	2,900	12,900	14,250	32,400
19.....	.....	.....	.....	.....	.....	.....	.....	.....	3,600	17,400	12,900	17,400
20.....	.....	.....	.....	.....	.....	.....	.....	.....	2,900	16,600	16,500	16,500
21.....	.....	.....	.....	.....	.....	.....	.....	.....	16,950	13,800	15,600	16,500
22.....	.....	.....	.....	.....	.....	.....	.....	.....	12,900	9,800	15,600	12,900
23.....	.....	.....	.....	.....	.....	.....	.....	.....	23,400	11,100	82,400	17,400
24.....	.....	.....	.....	.....	.....	.....	.....	.....	19,050	11,550	23,400	16,050
25.....	.....	.....	.....	.....	.....	.....	.....	.....	32,400	12,000	20,400	32,400
26.....	.....	.....	.....	.....	.....	.....	.....	.....	12,900	16,100	19,500	33,900
27.....	.....	.....	.....	.....	.....	.....	.....	.....	13,800	7,500	13,350	32,400
28.....	.....	.....	.....	.....	.....	.....	.....	.....	19,500	23,400	15,600	53,400
29.....	.....	.....	.....	.....	.....	.....	.....	.....	8,350	14,700	15,050	97,400
30.....	.....	.....	.....	.....	.....	.....	.....	.....	2,900	15,600	15,600	32,400
31.....	.....	.....	.....	.....	.....	.....	.....	.....	2,900	17,400	.....	24,400
Maximum.....	.....	.....	.....	.....	.....	.....	.....	.....	34,900	61,400	87,400	58,400
Minimum.....	.....	.....	.....	.....	.....	.....	.....	.....	2,200	7,500	11,550	12,900
Mean.....	.....	.....	.....	.....	.....	.....	.....	.....	7,292	16,884	22,040	24,184

NOTE.—Daily discharge determined from a poorly defined rating curve. Station first established August 9, 1910.

Daily and monthly discharges, in liters per second, of Quinali River near Quinali, Polangui, Albay, for the year 1911

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	23,400	12,900	18,400	12,900	13,800	9,300	90,400	17,400	12,000	11,550	9,300	12,000
2.....	21,400	12,900	17,400	12,900	14,700	8,350	68,900	16,050	11,100	10,200	9,300	12,450
3.....	19,900	12,450	16,950	12,900	16,050	8,400	53,400	15,000	10,650	10,200	9,300	12,450
4.....	20,400	12,400	16,500	12,000	14,250	8,400	53,500	13,150	10,200	10,200	9,300	12,450
5.....	20,400	12,400	16,500	12,000	15,150	8,350	52,500	13,150	10,200	10,200	9,300	12,000
6.....	20,400	11,550	16,500	12,000	15,150	8,350	52,500	13,150	10,200	10,200	9,300	11,100
7.....	19,400	12,450	13,350	12,000	13,800	8,400	16,500	12,900	10,650	10,200	12,300	11,100
8.....	18,400	11,550	13,800	12,350	12,900	8,350	17,400	12,000	12,000	12,000	14,250	12,450
9.....	20,400	11,550	13,800	12,350	12,900	8,400	16,050	12,900	11,100	11,550	12,000	12,000
10.....	19,400	17,900	13,800	21,400	12,450	8,400	47,400	12,000	11,550	12,000	10,200	12,900
11.....	17,400	20,400	17,900	16,950	12,000	9,300	63,000	13,350	12,900	11,100	9,750	11,550
12.....	16,500	18,400	15,600	14,700	12,450	9,300	63,900	13,350	13,350	11,100	10,200	12,000
13.....	15,600	16,600	15,150	13,350	12,000	12,000	78,400	13,350	13,800	11,550	11,100	12,000
14.....	15,600	16,600	14,250	12,900	13,800	10,200	43,400	12,000	16,050	10,650	10,200	12,000
15.....	14,700	16,500	13,800	14,700	12,900	9,750	32,400	10,200	13,800	11,100	16,050	12,000
16.....	15,600	17,400	12,900	15,150	12,000	12,900	25,900	10,200	13,800	11,100	21,400	11,100
17.....	15,150	18,900	13,800	13,800	12,000	11,550	21,900	11,550	14,700	12,000	16,050	10,650
18.....	14,700	20,400	13,350	14,700	11,550	13,350	22,400	37,900	13,350	12,450	14,700	10,200
19.....	14,700	25,900	12,900	13,800	10,200	12,000	20,400	32,400	12,900	11,100	14,700	10,200
20.....	14,250	31,900	12,900	13,800	12,900	10,200	19,400	101,900	13,800	10,200	13,800	11,100
21.....	16,500	26,400	12,900	13,800	11,100	9,300	18,400	24,400	23,400	9,750	12,900	10,650
22.....	14,700	19,400	12,900	23,400	11,100	9,300	20,400	17,900	16,600	10,200	12,000	10,200
23.....	14,250	17,900	12,000	12,450	8,850	9,750	20,400	22,900	16,600	10,650	11,550	10,650
24.....	13,800	18,400	12,450	15,150	8,850	9,300	18,900	16,600	16,600	10,650	11,100	10,650
25.....	13,800	25,400	14,700	13,800	9,300	8,350	13,600	16,050	13,800	10,650	10,650	10,650
26.....	13,800	24,400	14,700	12,900	8,350	7,950	17,900	14,700	12,900	10,200	11,550	10,650
27.....	13,800	21,900	14,700	12,900	8,400	8,400	17,900	12,900	12,900	9,300	11,550	10,650
28.....	13,350	.....	13,350	12,900	8,400	12,450	21,900	12,900	12,900	9,300	11,100	10,650
29.....	13,350	.....	13,350	12,900	9,300	14,250	20,400	12,900	12,450	9,300	10,200	10,650
30.....	12,900	.....	13,350	.....	8,400	.....	20,400	12,000	.....	.....	.....	.....
31.....	12,900	.....	13,350	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maximum.....	23,400	31,900	18,400	43,900	16,050	13,350	90,400	101,900	23,400	19,900	21,400	13,350
Minimum.....	12,900	11,100	12,000	12,000	8,400	7,950	15,600	10,200	9,300	9,300	7,950	10,200
Mean.....	16,754	17,575	14,502	15,166	11,898	9,825	31,614	18,689	13,207	11,050	11,788	11,513

Note.—Daily discharge determined from a poorly defined rating curve.

*Daily and monthly discharges, in liters per second, of Quinali River near Quinali, Polangui, Albay, for the year 1912*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	10,200	11,550	12,000	9,750								
2	11,100	11,100	12,000	9,300								
3	10,200	11,100	12,000	8,850								
4	11,100	11,100	12,000	9,300								
5	12,900	15,150	11,100	8,400								
6	13,350	13,350	11,100	8,400								
7	12,450	12,000	11,100	8,850								
8	12,000	12,000	10,650	8,850								
9	11,100	12,000	11,100	8,850								
10	11,100	12,000	10,200	8,850								
11	11,100	12,450	11,100	9,750								
12	20,400	12,900	11,100	9,300								
13	19,400	12,450	9,750	8,400								
14	15,150	12,000	10,200	9,750								
15	13,800	11,100	10,200	9,300								
16	12,900	11,550	10,200	8,400								
17	12,900	11,100	9,750	9,300								
18	12,900	11,100	9,750	8,400								
19	12,900	12,450	10,200	9,300								
20	12,450	19,400	10,200									
21	12,000	17,400	10,200									
22	12,000	13,350	10,200									
23	11,550	12,900	11,100									
24	12,000	12,450	9,750									
25	12,000	12,000	9,750									
26	12,000	12,450	10,200									
27	12,000	12,900	9,750									
28	12,000	12,000	9,750									
29	11,550	12,900	9,750									
30	12,000	11,550	9,750									
31	20,400	19,400	12,000	9,750								
Maximum	20,400	19,400	12,000	9,750								
Minimum	10,200	11,100	9,750	8,400								
Mean	12,554	13,010	10,560	9,008								

NOTE.—Daily discharge determined from a poorly defined rating curve. Station maintenance abandoned after April 20, 1912.



Daily and monthly discharges, in liters per second, of Quinali River near Quinali, Polangui, Albay, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	.....	.....	10,740	8,420	5,740	4,950	8,420	11,100	15,280	8,420	17,320	30,040
2.....	.....	.....	10,740	8,740	5,740	4,950	37,460	8,740	11,820	7,500	14,380	25,320
3.....	.....	.....	10,400	8,420	5,740	4,450	21,440	8,740	6,900	7,800	8,200	24,320
4.....	.....	.....	10,060	8,420	5,470	4,700	21,920	33,380	6,040	10,060	7,500	35,100
5.....	.....	.....	9,720	8,420	5,740	4,450	8,420	18,280	4,950	9,380	12,560	33,380
6.....	.....	.....	9,720	8,420	5,740	4,200	11,460	11,100	4,700	9,060	14,380	27,900
7.....	.....	.....	9,380	8,420	5,740	4,450	10,060	18,280	4,950	8,740	14,380	22,400
8.....	.....	.....	9,380	8,100	5,470	4,700	9,380	11,820	5,740	9,380	17,380	26,340
9.....	.....	.....	9,720	8,740	5,200	22,880	8,740	14,880	18,280	16,960	12,560	23,360
10.....	.....	.....	10,740	8,740	5,200	18,280	8,740	10,740	10,400	26,340	16,540	20,520
11.....	.....	.....	10,400	8,420	4,700	11,820	8,740	8,100	15,280	18,280	14,480	17,820
12.....	.....	.....	9,720	8,420	4,700	11,100	10,740	6,600	12,180	12,940	15,280	15,280
13.....	.....	11,820	9,720	8,100	4,700	8,420	9,060	12,560	24,320	12,180	12,560	13,700
14.....	.....	11,820	9,060	8,420	4,450	7,800	8,740	11,460	16,120	12,560	33,380	11,460
15.....	.....	11,460	9,380	8,420	4,450	5,740	8,100	14,480	15,280	20,980	45,460	9,380
16.....	.....	12,180	9,060	8,100	3,950	5,740	7,500	8,740	16,540	12,560	39,260	13,700
17.....	.....	13,700	9,380	7,800	4,200	5,200	6,900	8,420	66,540	11,460	48,620	15,280
18.....	.....	12,180	9,060	7,500	4,700	5,200	6,600	7,200	26,340	7,500	83,820	36,260
19.....	.....	11,460	9,380	6,900	5,200	12,180	7,800	11,820	20,520	14,480	47,340	75,500
20.....	.....	11,100	8,740	6,900	5,200	10,740	9,060	19,160	15,280	24,320	37,460	39,260
21.....	.....	11,460	8,740	6,900	4,950	10,740	8,100	14,880	11,820	19,160	32,820	27,900
22.....	.....	10,740	8,420	7,200	4,700	6,320	7,200	11,820	7,800	16,120	30,580	22,400
23.....	.....	11,100	8,420	6,900	4,200	5,740	7,500	10,740	7,500	14,880	27,380	18,720
24.....	.....	11,100	8,740	6,900	4,200	5,740	12,560	10,740	5,200	7,800	26,340	20,060
25.....	.....	10,740	8,740	6,600	4,200	5,200	11,460	10,400	6,900	14,880	20,520	19,600
26.....	.....	11,100	8,740	6,320	6,040	41,120	10,400	8,420	6,900	18,720	18,720	17,820
27.....	.....	11,100	8,420	6,600	6,000	37,460	9,380	7,200	6,900	12,940	22,400	17,820
28.....	.....	10,740	8,420	6,600	5,470	14,480	11,100	8,100	6,900	10,740	23,360	19,600
29.....	.....	.....	8,740	6,320	5,200	11,820	10,400	10,400	5,740	12,180	24,320	22,400
30.....	.....	.....	8,740	5,740	4,700	6,900	17,820	36,260	5,200	20,060	26,340	22,880
31.....	.....	.....	8,420	.....	4,700	.....	12,940	20,060	.....	23,840	.....	19,160
Maximum.....	.....	13,700	10,740	8,740	6,600	41,120	37,460	36,260	66,540	26,340	83,820	75,500
Minimum.....	.....	10,740	8,420	5,740	3,950	4,200	6,600	6,600	4,700	7,500	7,500	9,380
Mean.....	.....	11,486	9,324	7,663	5,056	10,249	11,241	13,052	12,915	13,732	25,571	24,061

NOTE.—Daily discharge determined from a fairly well-defined curve from 4,000 to 19,000 second-liters, applicable from February 12 to December 31.

Daily and monthly discharges, in liters per second, of Quinali River near Quinali, Polangui, Albay, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	19,540	12,420	15,320	8,160	4,390	5,520	11,950	4,940	10,170	6,420	7,800	37,080
2	21,660	11,950	14,320	7,440	5,220	4,940	6,760	4,940	8,160	8,940	7,440	26,960
3	18,480	11,950	13,360	8,160	4,660	5,520	5,220	4,940	8,160	15,830	13,360	23,780
4	25,900	12,890	12,890	7,440	4,390	4,940	10,610	4,390	7,440	13,830	37,560	18,480
5	24,310	11,950	13,360	6,760	4,390	4,390	8,940	4,940	7,440	17,950	19,010	19,540
6	20,070	11,500	12,420	6,110	5,520	4,120	8,160	3,400	6,760	13,360	13,830	31,730
7	21,660	11,950	11,060	5,520	4,120	4,940	7,440	3,400	6,760	11,050	13,360	24,840
8	23,780	11,500	11,500	8,940	4,940	4,940	8,160	3,400	5,520	7,800	14,810	21,660
9	21,130	10,610	11,500	7,100	5,520	5,520	7,800	2,960	4,660	7,800	11,950	20,660
10	19,540	11,050	12,420	6,420	4,390	10,610	13,830	3,400	7,440	6,760	11,500	17,420
11	16,360	10,610	11,500	7,440	5,820	8,940	29,080	1,860	7,440	7,800	11,500	16,360
12	14,810	12,420	11,500	8,160	6,760	5,520	24,310	1,860	6,760	7,800	11,500	14,320
13	16,360	13,360	11,500	7,440	6,110	4,390	15,320	2,190	6,110	7,800	14,320	16,890
14	20,600	19,540	10,610	6,420	7,100	4,940	10,610	6,110	5,520	23,250	15,320	13,360
15	19,540	36,500	10,170	5,520	7,440	4,390	8,160	6,110	5,520	81,020	21,660	11,500
16	21,130	23,250	9,750	4,390	7,800	4,940	6,760	4,390	6,110	66,180	22,720	18,480
17	26,430	18,480	10,170	4,660	8,160	4,390	5,520	22,720	6,760	42,860	20,600	16,320
18	20,070	16,360	11,950	4,390	8,940	4,660	5,520	23,780	8,940	29,610	17,420	16,890
19	19,540	16,360	9,330	4,390	8,160	4,390	5,520	19,010	8,940	23,780	15,320	15,320
20	17,420	15,320	9,750	3,870	8,160	5,220	4,390	15,320	11,950	19,540	12,420	15,320
21	7,440	15,320	10,610	3,400	7,440	4,390	4,390	7,440	12,420	16,890	13,360	11,950
22	15,830	11,500	9,750	3,400	6,760	5,520	3,870	4,940	13,360	11,500	14,320	11,500
23	14,810	12,420	10,170	3,400	7,100	6,760	2,960	4,390	20,600	11,500	13,360	11,950
24	13,360	16,360	9,750	4,120	5,820	6,760	2,960	6,760	12,420	10,610	12,420	11,500
25	14,810	17,420	9,750	4,390	5,520	6,420	2,760	7,750	16,890	10,610	11,950	11,950
26	13,360	18,480	8,940	4,940	5,520	7,100	3,870	9,750	9,750	9,750	11,500	14,320
27	12,420	16,890	8,160	4,940	5,220	14,320	8,160	32,660	11,950	9,750	12,420	11,050
28	11,500	16,360	8,160	4,940	5,520	16,360	6,760	21,660	9,750	8,940	13,830	11,500
29	11,050	.....	8,160	4,390	6,220	16,360	4,660	14,320	7,800	8,940	13,830	11,500
30	13,360	.....	7,440	.....	4,390	.....	4,390	10,610	.....	7,800	.....	9,750
31	26,430	56,110	15,320	8,940	8,940	16,360	29,080	32,260	21,660	81,020	37,560	37,080
Maximum	7,440	10,610	7,440	3,400	4,120	3,870	2,760	1,700	4,660	6,420	7,440	9,750
Minimum	17,929	16,580	10,835	5,710	6,041	6,424	8,220	8,592	9,221	17,797	14,785	17,158
Mean	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

NOTE.—Daily discharge determined from a fairly well-defined curve. Applicable from January 1 to February 24, 1922.

Daily and monthly discharges, in liters per second, of Quinali River near Quinali, Polangui, Albay, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	9,400	28,120	14,740	14,740	5,540	5,540	6,060	6,060	16,240	12,590	32,340	27,560
2.....	12,590	18,300	16,240	14,000	6,060	6,060	6,060	7,950	13,280	12,590	46,020	31,080
3.....	11,260	18,720	14,740	13,280	6,060	6,060	17,880	8,810	10,000	10,620	59,780	26,460
4.....	10,620	16,240	14,370	12,590	5,540	5,040	119,580	10,000	10,620	11,920	33,660	27,560
5.....	9,700	14,000	12,330	13,280	6,060	4,120	24,360	8,810	11,260	12,590	36,420	34,340
6.....	9,700	15,430	14,000	13,280	6,580	4,120	24,360	8,810	12,590	11,260	28,680	29,880
7.....	9,400	16,240	68,060	12,590	5,540	6,580	14,000	8,810	12,590	19,710	28,940	25,360
8.....	8,810	17,460	62,440	11,920	5,540	6,580	13,280	8,810	12,590	19,710	23,320	25,360
9.....	8,810	16,240	31,880	10,620	5,540	6,580	13,280	8,810	12,590	19,710	23,320	25,360
10.....	8,810	15,240	31,880	10,620	5,540	6,580	13,280	8,810	12,590	19,710	23,320	25,360
11.....	8,810	15,240	28,350	10,620	5,540	6,580	13,280	8,810	12,590	19,710	23,320	25,360
12.....	8,810	15,240	28,350	10,620	5,540	6,580	13,280	8,810	12,590	19,710	23,320	25,360
13.....	8,810	15,240	28,350	10,620	5,540	6,580	13,280	8,810	12,590	19,710	23,320	25,360
14.....	8,810	15,240	28,350	10,620	5,540	6,580	13,280	8,810	12,590	19,710	23,320	25,360
15.....	10,000	11,920	18,300	13,280	4,120	11,260	6,580	8,810	24,360	9,400	33,660	34,340
16.....	10,000	11,920	18,300	13,280	4,120	11,260	6,580	8,810	24,360	9,400	33,660	34,340
17.....	14,740	9,700	11,880	9,400	3,690	10,000	8,230	7,670	12,930	14,740	25,400	25,400
18.....	14,740	10,000	15,720	10,000	3,270	6,320	7,670	6,060	12,930	12,260	25,400	24,360
19.....	15,110	9,400	20,060	9,400	6,060	6,320	7,670	6,060	11,920	10,620	23,360	20,520
20.....	10,620	10,000	30,480	8,810	4,340	9,400	9,400	5,540	11,260	10,000	24,360	32,340
21.....	10,000	18,300	24,360	8,810	2,190	8,810	9,400	6,060	11,590	10,620	34,360	25,400
22.....	9,400	14,740	20,520	8,230	2,340	6,320	9,400	6,060	11,590	11,920	34,360	23,880
23.....	9,400	27,560	21,900	7,670	4,120	6,320	9,400	6,060	12,260	9,700	59,780	22,880
24.....	10,000	22,380	20,520	7,120	3,690	12,590	10,000	6,060	12,930	11,260	82,780	22,880
25.....	10,000	16,640	15,480	6,580	3,270	10,940	12,590	6,060	12,930	11,260	82,780	22,880
26.....	9,400	49,660	14,740	6,850	3,690	12,590	9,400	5,540	21,440	10,940	118,940	44,220
27.....	9,400	37,140	14,740	6,850	3,270	6,320	8,810	6,850	15,110	13,280	76,420	25,400
28.....	9,400	23,350	14,370	6,850	3,270	7,120	8,810	6,850	14,740	11,920	37,880	24,360
29.....	10,000	12,930	14,000	6,580	3,270	6,320	8,230	7,950	14,000	11,590	37,140	22,880
30.....	11,260	14,740	17,880	6,060	4,120	6,320	7,120	8,810	13,280	13,630	29,880	20,520
31.....	15,860	14,740	14,740	5,540	7,120	5,540	6,320	12,930	.....	22,880	.....	20,560
Maximum.....	15,860	49,660	68,060	14,740	7,120	12,590	119,580	16,640	92,900	22,880	114,980	44,220
Minimum.....	8,810	9,400	12,330	5,540	2,190	4,120	6,060	5,540	10,000	9,400	23,360	25,360
Mean.....	10,680	17,844	21,817	9,577	4,681	7,736	13,363	8,379	18,164	11,794	47,688	26,995

NOTE.—See footnote to daily discharge table for 1920.

Daily and monthly discharges, in liters per second, of Quinali River near Quinali, Polangui, Albay, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	19,600	21,440	19,980	13,200	6,660	6,560	7,960	72,960	7,680	14,420	11,640	86,700
2.....	20,060	25,920	19,980	12,500	7,960	6,040	7,960	68,520	13,200	11,640	12,400	31,060
3.....	17,040	19,600	18,100	11,210	9,460	4,600	12,400	19,580	15,280	11,640	18,400	26,700
4.....	17,880	19,600	16,340	9,460	9,460	3,740	10,200	14,840	18,080	11,260	35,220	25,520
5.....	18,300	19,600	15,520	9,460	11,840	5,260	8,880	15,720	24,940	11,640	72,960	41,140
6.....	17,040	19,600	16,340	9,460	9,460	8,260	8,560	22,720	16,180	11,640	38,180	29,780
7.....	18,720	18,720	16,340	9,460	8,420	6,560	7,400	24,940	14,840	10,900	22,720	23,820
8.....	15,700	16,240	16,340	7,520	8,420	5,520	6,560	22,720	14,000	10,900	26,100	26,100
9.....	18,720	15,480	16,340	8,420	7,520	5,040	7,120	17,600	14,420	10,900	21,660	24,940
10.....	17,040	14,740	16,340	8,420	14,720	5,040	22,720	15,720	10,900	10,900	21,140	22,720
11.....	17,040	15,110	17,200	8,920	13,200	4,600	16,640	13,200	14,840	11,640	19,580	23,820
12.....	32,340	14,000	16,340	8,920	11,210	4,160	10,200	11,640	13,600	13,600	19,580	23,820
13.....	35,020	15,480	15,520	8,420	10,580	3,740	7,400	13,200	13,200	18,080	20,100	22,720
14.....	25,400	15,480	14,720	11,840	9,460	3,740	6,040	15,720	9,520	21,660	23,820	21,140
15.....	25,400	15,860	16,340	10,580	8,420	3,340	6,040	31,060	6,560	19,580	16,180	19,580
16.....	25,400	15,480	18,100	9,460	6,660	3,740	5,520	38,180	6,560	39,660	23,260	17,600
17.....	28,680	14,740	18,100	8,420	5,900	4,380	5,520	27,300	8,560	20,100	19,080	27,300
18.....	20,520	15,480	19,980	7,520	9,460	6,040	5,780	21,660	9,520	16,640	16,640	30,420
19.....	18,720	14,740	19,980	6,660	9,460	4,600	10,900	14,840	12,020	14,820	18,580	29,780
20.....	17,880	14,000	18,100	6,660	8,420	2,950	20,620	12,400	10,900	13,200	29,780	83,320
21.....	17,040	13,280	16,340	7,520	10,900	5,040	23,820	10,900	9,200	12,020	47,060	82,580
22.....	18,720	14,000	13,200	6,660	12,400	9,200	22,720	8,260	35,220	10,900	43,360	68,520
23.....	18,720	13,280	10,900	7,960	10,900	6,040	20,620	7,680	31,060	10,900	27,300	61,860
24.....	19,600	12,580	10,900	7,960	11,640	6,040	17,600	8,260	22,720	11,260	19,580	47,060
25.....	19,600	15,980	8,920	7,520	9,520	5,520	17,120	7,680	19,580	12,400	20,620	50,760
26.....	18,720	22,040	10,900	7,520	10,900	5,520	14,840	8,260	16,640	12,400	18,580	38,180
27.....	19,600	13,980	37,240	7,520	9,520	4,600	13,600	8,260	23,260	12,020	72,960	41,140
28.....	19,600	13,980	19,980	6,660	7,680	4,600	13,600	7,680	20,100	11,640	55,940	38,180
29.....	17,880	.....	18,100	6,660	6,840	4,600	10,200	7,680	16,640	10,900	75,920	31,720
30.....	16,640	.....	16,340	6,660	5,520	5,520	8,880	7,680	15,280	11,260	50,760	28,540
31.....	16,240	.....	16,340	.....	5,040	.....	84,060	7,680	.....	10,900	.....	81,100
Maximum.....	35,020	25,920	37,240	13,200	14,720	9,200	87,020	72,960	35,220	39,660	75,920	83,320
Minimum.....	16,240	12,580	8,920	6,660	5,040	3,340	5,520	7,680	6,560	10,900	11,640	17,600
Mean.....	20,343	17,016	16,872	8,655	9,276	5,231	14,786	17,734	15,842	13,904	30,489	37,325

Notiz.—Discharge determined from rating curves applicable as follows: February 25 to May 20, 1922, poorly defined; May 21 to December 31, 1922, fairly well-defined below 36,000 second-liters.

## ALBAY PROVINCE

## SAN FRANCISCO RIVER, MALINAO

LOCATION.—About 32 km. from Legaspi on the bridge of the Legaspi-Tui Road.

RECORDS AVAILABLE.—From February 22, 1919, to December 31, 1922. Also from March 29, 1910, to April 20, 1912, inclusive, at place 1.5 km. above present station.

GAGE.—Standard metric gage board fastened, vertically on down-stream right abutment, by means of anchor bolts.

DISCHARGE MEASUREMENT.—Made from bridge.

CHANNEL AND BANKS.—Channel is straight for 18 m. above and 15 m. below gaging section; left bank high, right bank low and subject to overflow. At measuring section stream bed mostly sand and very shifting.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 41,070 second-liters on December 21, 1922, estimated from extension of rating curve; minimum discharge, 205 second-liters on June 15 and 16, 1922.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge for March 29, 1910, to April 20, 1912 and from February 22, 1919, to December 31, 1922, are determined from a well-defined curve. Gage read twice daily.

*Discharge measurements of San Francisco River, near Población, Malinao, Albay*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1910</b>				
March 29.....	J. I. Quinn	1 00	3,500	
April 16.....	do.	1 60	4,230	
May 17.....	do.	1 07	1,910	
June 30.....	do.	1 10	2,180	
August 4.....	do.	1 10	1,150	
August 8.....	do.	1 10	1,105	
October 13.....	do.	1 03	1,470	
October 13.....	H. V. Hall..	1 03	1,480	
October 15.....	do.	1 16	2,690	
October 15.....	do.	1 16	2,840	
November 23.....	J. I. Quinn	1 33	4,650	
December 15.....	Sawyer...	1 64	8,920	
December 16.....	do.	1 40	5,690	
December 17.....	do.	2 03	18,670	
December 28.....	do.	1 79	18,430	
December 30.....	do.	1 67	9,600	
<b>1911</b>				
January 10.....	do.	1 34	4,260	
January 10.....	do.	1 34	4,420	
February 1.....	do.	1 16	2,450	
February 13.....	W. Demers.	1 34	4,460	
February 14.....	do.	1 39	5,370	
March 15.....	do.	1 23	3,626	
April 1.....	do.	1 16	2,900	
April 11.....	do.	1 23	3,330	
April 24.....	do.	1 19	3,120	
May 1.....	do.	1 11	2,280	
May 12.....	do.	1 14	2,280	
May 31.....	do.	1 08	1,470	
June 13.....	do.	1 08	1,710	
June 15.....	do.	1 08	2,130	
June 24.....	do.	1 01	1,230	
June 28.....	do.	1 00	1,210	
July 17.....	do.	1 23	3,120	
July 26.....	do.	1 11	1,710	
August 8.....	do.	1 02	1,360	

*Discharge measurements of San Francisco River, near Población, Malinao,  
Albay—Continued*

Date	Made by—	Gage height (meters)	Discharge (second- liters)	Remarks
<b>1911</b>				
August 22 . . . . .	W. Demers.	1.08	1,660	
September 8 . . . . .	do	.97	1,230	
September 21 . . . . .	do.	1.03	1,280	
October 7 . . . . .	do.	.96	710	
October 20 . . . . .	do.	.96	710	
December 8 . . . . .	do	1.00	1,100	
December 18 . . . . .	do.	1.03	1,330	
December 29 . . . . .	do.	1.00	1,090	
<b>1912</b>				
January 5 . . . . .	do.	1.04	1,570	
January 17 . . . . .	do	1.03	1,400	
February 12 . . . . .	do.	1.08	1,150	
February 21 . . . . .	do.	1.64	9,570	
February 28 . . . . .	do.	1.14	2,110	
March 6 . . . . .	do.	1.06	1,590	
March 12 . . . . .	do.	1.03	1,100	
March 23 . . . . .	do.	1.06	1,600	
April 8 . . . . .	do.	1.00	1,060	
<b>1919</b>				
March 3 . . . . .	do.	.88	1,420	
March 24 . . . . .	A. Fegarido	.85	1,230	
March 29 . . . . .	do.	.84	1,210	
April 21 . . . . .	do	.76	790	
May 12 . . . . .	do	.69	510	
May 15 . . . . .	do.	.70	610	
May 20 . . . . .	do.	.68	430	
June 14 . . . . .	do.	.71	660	
July 3 . . . . .	do	.90	1,560	
July 23 . . . . .	do.	.85	1,270	
July 25 . . . . .	do	.76	750	
August 20 . . . . .	do.	1.17	3,290	
September 1 . . . . .	A. Fegarido and M. Canas	.82	1,150	
September 19 . . . . .	do	.98	2,360	
October 6 . . . . .	do	.88	1,300	
October 13 . . . . .	do	.87	1,370	
October 28 . . . . .	do	.96	2,320	
November 6 . . . . .	do.	1.25	3,870	
November 28 . . . . .	A. Fegarido	1.30	4,210	
December . . . . .	do	1.18	3,490	
<b>1920</b>				
January 7 . . . . .	M. B. Canas.	1.16	3,160	
January 12 . . . . .	do.	1.11	2,870	
February 19 . . . . .	do.	1.12	2,930	
March 3 . . . . .	do	1.03	2,380	
March 22 . . . . .	do.	.86	1,990	
March 31 . . . . .	do.	.82	950	
April 5 . . . . .	do.	.80	940	
April 26 . . . . .	do.	.78	910	
April 28 . . . . .	do.	.96	1,740	
May 21 . . . . .	do.	.76	790	
June 2 . . . . .	do.	.73	800	
June 4 . . . . .	do.	.69	660	
June 21 . . . . .	do.	.57	550	
June 23 . . . . .	do.	.56	390	
July 19 . . . . .	do.	.78	610	
August 3 . . . . .	O. Buenaventura	.68	500	
August 14 . . . . .	do.	.63	240	
September 16 . . . . .	do.	.64	440	
October 19 . . . . .	do.	.82	1,199	
November 2 . . . . .	do.	.71	727	
November 16 . . . . .	do.	1.04	3,222	
December 1 . . . . .	do.	1.96	10,565	
December 15 . . . . .	do.	.94	2,123	
<b>1921</b>				
January 3 . . . . .	do.	1.10	3,039	
January 20 . . . . .	do.	.92	1,385	
February 4 . . . . .	do.	1.28	4,284	
February 19 . . . . .	do.	1.22	4,006	
March 5 . . . . .	do.	.99	2,796	
March 19 . . . . .	do.	2.02	11,501	
April 4 . . . . .	do.	.90	1,774	
April 20 . . . . .	do.	.79	1,051	

*Discharge measurements of San Francisco River, near Población, Malinao,  
Albay—Continued*

Date	Made by—	Gage height (meters)	Discharge (second- liters)	Remarks
<b>1921</b>				
May 2.....	O. Buenaventura ..	.81	1,184	
May 10.....	do. ....	.78	1,061	
June 3.....	do. ....	.86	1,477	
July 8.....	do. ....	.93	1,945	
July 27.....	do. ....	.76	833	
July 28.....	do. ....	.76	781	
August 25.....	do. ....	.61	433	
September 3.....	do. ....	.90	1,578	
September 5.....	do. ....	.85	2,027	
September 19.....	do. ....	.82	1,270	
October 3.....	do. ....	.87	1,350	
October 14.....	do. ....	1 13	2,285	
November 5.....	do. ....	1 57	6,912	
December 2.....	S. Musa..	1 16	4,168	
December 22.....	O. Buenaventura...	1 22	4,097	
<b>1922</b>				
January 2.....	do. ....	1 08	3,275	
January 31.....	S. Musa ..	1 12	3,751	
February 21.....	O. Buenaventura	1 01	2,530	
March 6.....	do. ....	.95	2,057	
March 22.....	do. ....	1 00	2,519	
April 1.....	do. ....	1 05	2,511	
April 18.....	do. ....	1 04	2,531	
May 2.....	O. Buenaventura	.90	1,421	
May 11.....	do. ....	.81	1,103	
May 22.....	do. ....	.99	1,818	
June 2.....	do. ....	.73	477	
June 9.....	W. Demers and O. Bue naventura.	.72	408	
June 21.....	S. Musa and O. Buena- ventura.	.83	695	
July 7.....	do. ....	.77	513	
October 22.....	do. ....		1,804	
November 15.....	O. Buenaventura	1 13	3,276	
December 11.....	do. ....	1 16	4,163	
December 20.....	do. ....	1 15	4,112	

NOTE.—Gage height readings from March 3, 1919, referred to different data.

*Daily and monthly discharges, in liters per second, of San Francisco River near Población, Matinao, Albay, for the year 1910*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1..	..	..	..	1,410	1,590	1,680	1,970	2,170	1,500	2,170	5,850	3,510
2..	..	..	..	1,590	1,590	1,725	2,600	2,170	1,320	2,070	11,850	3,510
3...	..	..	..	1,970	1,725	1,590	2,930	1,870	1,410	4,530	9,690	6,930
4 ..	..	..	..	3,880	1,915	1,545	3,040	1,680	1,590	2,820	6,300	11,430
5 ..	..	..	..	2,170	2,015	1,680	4,140	1,680	1,500	2,380	4,950	7,920
6...	..	..	..	1,970	2,170	1,770	3,155	1,590	1,500	2,170	4,530	5,550
7...	..	..	..	2,490	1,970	1,500	2,490	1,500	1,410	1,970	3,750	5,400
8 ..	..	..	..	2,170	1,870	1,590	2,170	1,410	1,590	1,970	4,270	4,685
9...	..	..	..	1,590	2,115	1,500	2,070	1,590	1,970	2,070	3,750	4,270
10...	..	..	..	1,915	2,070	1,410	1,870	1,500	1,590	1,970	3,270	6,600
11...	..	..	..	1,725	2,970	2,600	1,870	1,410	2,600	1,770	3,270	4,800
12...	..	..	..	1,590	1,870	2,170	1,770	1,410	2,600	1,770	2,930	5,700
13...	..	..	..	1,455	1,815	1,870	1,870	1,410	3,750	1,590	5,850	5,100
14...	..	..	..	1,635	1,870	1,870	1,680	1,230	2,275	1,320	3,750	4,270
15...	..	..	..	1,870	1,770	1,770	1,970	1,410	1,970	1,770	3,270	10,830
16...	..	..	..	1,870	1,770	2,170	1,770	1,410	3,270	2,600	2,600	5,550
17...	..	..	..	1,680	1,725	2,170	1,680	1,410	2,820	2,600	2,600	14,760
18...	..	..	..	1,365	1,770	1,870	1,770	1,410	2,170	2,275	2,490	6,930
19...	..	..	..	1,215	1,915	2,710	1,590	1,410	3,040	1,870	5,100	5,700
20...	..	..	..	1,230	1,970	2,865	1,500	1,500	2,380	1,590	4,270	4,800
21...	..	..	..	1,185	1,815	2,535	1,590	1,590	2,380	1,590	4,665	4,530
22...	..	..	..	1,215	1,870	2,600	1,770	1,590	3,040	2,275	7,920	7,530
23...	..	..	..	1,590	1,915	3,555	1,590	1,970	2,380	2,070	4,950	7,260
24...	..	..	..	2,425	1,635	4,710	1,590	1,970	2,170	2,600	4,800	27,240
25...	..	..	..	1,725	1,635	3,390	1,410	2,170	1,970	1,970	4,010	15,720
26...	..	..	..	1,970	1,275	2,600	1,410	1,770	2,275	1,680	3,750	9,880
27...	..	..	..	1,680	1,590	2,710	1,230	2,170	2,710	1,590	4,800	7,920
28...	..	..	..	1,435	1,545	2,490	1,230	1,680	3,750	1,970	4,270	17,160
29...	..	..	1,050	2,820	1,635	2,170	1,590	1,410	2,820	1,970	5,250	14,280
30...	..	..	1,320	1,815	1,635	1,870	1,410	1,410	2,380	3,390	4,140	9,880
31...	..	..	1,410	..	1,590	..	1,410	1,680	..	..	..	8,435
Maximum.	..	..	1,410	3,880	2,170	4,710	4,140	2,170	3,750	4,530	11,850	27,240
Minimum.	..	..	1,050	1,185	1,275	1,410	1,230	1,230	1,320	1,320	2,441	3,510
Mean.	..	..	1,260	1,809	1,738	2,231	1,294	1,355	2,271	2,162	4,441	8,326

NOTE.—Daily discharges determined from a well-defined curve between 700 and 18,600 second-liters. Values above and below these limits are estimated from extension of curve. Applicable from March 22 to December 31, 1910.



Daily and monthly discharges, in liters per second, of San Francisco River near Población, Matinao, Albay, for the year 1911

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	8,970	2,600	4,800	2,710	1,970	1,770	6,150	1,770	870	960	700	1,680
2.....	7,095	2,600	4,270	2,600	1,870	1,590	4,270	1,580	870	960	700	1,500
3.....	6,900	2,380	4,530	2,710	2,070	1,590	2,490	1,580	870	960	700	1,230
4.....	6,300	2,380	4,400	2,490	2,070	1,410	2,560	1,580	870	960	700	1,050
5.....	6,765	2,170	4,380	2,380	2,275	1,770	2,610	1,580	870	960	700	1,050
6.....	5,700	2,380	3,880	2,490	1,770	1,590	2,070	1,230	785	870	700	1,050
7.....	5,950	2,600	3,750	2,710	1,770	1,590	2,070	1,230	785	870	700	1,050
8.....	5,100	2,380	3,820	2,710	1,390	1,870	1,970	1,230	785	870	700	1,050
9.....	5,100	2,380	3,820	2,710	1,390	1,870	1,970	1,230	785	870	700	1,050
10.....	4,530	1,970	3,040	3,270	3,270	1,680	2,600	1,140	1,140	700	700	960
11.....	4,270	2,600	4,010	3,390	2,820	3,270	2,070	1,050	1,500	870	700	870
12.....	4,010	6,450	5,850	2,930	2,490	3,270	1,970	1,050	1,230	870	620	1,050
13.....	4,010	5,100	4,010	2,820	2,380	2,170	8,790	1,050	1,410	1,050	1,050	1,050
14.....	4,400	5,100	3,510	2,600	2,275	1,870	8,790	1,140	1,050	870	960	870
15.....	4,010	5,100	3,155	2,600	2,275	1,770	4,800	1,050	1,050	870	1,050	1,230
16.....	3,750	5,400	2,820	2,600	2,275	1,680	4,010	1,050	1,140	870	1,140	1,870
17.....	3,750	4,530	2,600	2,490	2,170	1,770	3,510	960	1,230	870	1,230	1,500
18.....	3,510	6,930	2,600	2,600	2,170	1,770	3,270	1,050	1,230	1,140	1,230	1,320
19.....	3,270	12,900	2,490	2,600	1,970	1,500	2,820	1,680	1,140	1,050	1,050	1,410
20.....	3,270	10,450	2,380	2,490	1,970	1,410	2,490	1,870	1,140	1,050	1,140	1,870
21.....	3,390	13,590	2,275	2,710	1,970	1,230	2,380	1,590	1,230	700	960	1,410
22.....	3,155	9,690	2,070	2,710	1,970	1,230	2,380	1,590	1,500	870	1,050	1,320
23.....	3,040	7,095	2,170	3,270	2,070	1,230	2,380	1,590	1,500	870	1,050	1,230
24.....	3,040	5,950	2,070	2,710	1,970	1,230	2,380	1,770	1,230	785	960	1,060
25.....	2,820	6,150	2,170	2,380	1,970	1,230	2,380	1,770	1,140	700	1,500	1,060
26.....	2,820	9,330	4,950	2,170	1,970	1,140	1,770	1,580	1,050	700	1,050	1,050
27.....	2,820	6,930	6,600	2,070	1,870	1,140	1,770	1,500	1,140	700	960	960
28.....	2,600	5,550	5,100	2,070	1,870	1,140	1,770	1,500	1,050	620	960	960
29.....	2,600	...	3,750	2,275	1,590	1,140	1,590	1,230	1,140	870	960	870
30.....	2,710	...	3,270	2,070	1,590	1,140	1,590	1,230	1,050	700	1,370	1,140
31.....	2,710	...	2,930	...	1,680	...	1,680	960	...	...	...	1,140
Maximum	8,970	13,590	6,600	4,530	5,700	3,270	8,970	1,870	1,770	1,140	1,970	1,870
Minimum	2,600	1,970	2,070	2,070	1,590	1,140	1,590	960	785	620	540	1,870
Mean.....	4,246	5,442	3,246	2,681	2,264	1,599	3,017	1,367	1,134	828	978	1,187

NOTE.—Daily discharges determined from a well-defined curve between 700 and 13,600 second-liters. Values above and below these are estimated from extension of curve. Applicable throughout the year.

Daily and monthly discharges, in liters per second, of San Francisco River near Población, Malinao, Albay, for the year 1912

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	1,050	870	2,380	1,410	.....	.....	.....	.....	.....	.....	.....	.....
2.....	1,050	870	2,170	1,410	.....	.....	.....	.....	.....	.....	.....	.....
3.....	870	1,410	1,970	1,320	.....	.....	.....	.....	.....	.....	.....	.....
4.....	1,050	1,230	1,770	1,820	.....	.....	.....	.....	.....	.....	.....	.....
5.....	1,050	1,590	1,770	1,140	.....	.....	.....	.....	.....	.....	.....	.....
6.....	1,230	1,410	1,680	1,140	.....	.....	.....	.....	.....	.....	.....	.....
7.....	1,050	1,230	1,680	1,050	.....	.....	.....	.....	.....	.....	.....	.....
8.....	960	1,230	1,770	1,050	.....	.....	.....	.....	.....	.....	.....	.....
9.....	1,050	1,050	1,770	960	.....	.....	.....	.....	.....	.....	.....	.....
10.....	1,050	1,140	1,590	870	.....	.....	.....	.....	.....	.....	.....	.....
11.....	1,050	1,230	1,590	785	.....	.....	.....	.....	.....	.....	.....	.....
12.....	3,040	1,230	1,500	960	.....	.....	.....	.....	.....	.....	.....	.....
13.....	1,970	1,230	1,410	1,320	.....	.....	.....	.....	.....	.....	.....	.....
14.....	1,500	1,230	1,410	1,230	.....	.....	.....	.....	.....	.....	.....	.....
15.....	1,410	1,230	1,410	1,320	.....	.....	.....	.....	.....	.....	.....	.....
16.....	1,320	1,320	1,590	1,140	.....	.....	.....	.....	.....	.....	.....	.....
17.....	1,230	1,410	1,500	1,050	.....	.....	.....	.....	.....	.....	.....	.....
18.....	1,230	1,320	1,410	1,050	.....	.....	.....	.....	.....	.....	.....	.....
19.....	1,230	1,320	1,590	960	.....	.....	.....	.....	.....	.....	.....	.....
20.....	1,230	1,410	1,870	960	.....	.....	.....	.....	.....	.....	.....	.....
21.....	1,050	9,830	1,770	.....	.....	.....	.....	.....	.....	.....	.....	.....
22.....	1,050	4,500	1,680	.....	.....	.....	.....	.....	.....	.....	.....	.....
23.....	1,050	3,730	1,500	.....	.....	.....	.....	.....	.....	.....	.....	.....
24.....	1,050	3,830	1,410	.....	.....	.....	.....	.....	.....	.....	.....	.....
25.....	1,050	2,530	1,500	.....	.....	.....	.....	.....	.....	.....	.....	.....
26.....	1,050	2,400	1,590	.....	.....	.....	.....	.....	.....	.....	.....	.....
27.....	1,050	2,500	1,500	.....	.....	.....	.....	.....	.....	.....	.....	.....
28.....	1,050	2,380	1,500	.....	.....	.....	.....	.....	.....	.....	.....	.....
29.....	1,050	2,500	1,590	.....	.....	.....	.....	.....	.....	.....	.....	.....
30.....	960	2,500	1,590	.....	.....	.....	.....	.....	.....	.....	.....	.....
31.....	960	.....	1,500	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maximum.....	3,040	9,880	2,380	1,410	.....	.....	.....	.....	.....	.....	.....	.....
Minimum.....	870	870	1,410	785	.....	.....	.....	.....	.....	.....	.....	.....
Mean.....	1,210	2,075	1,644	1,122	.....	.....	.....	.....	.....	.....	.....	.....

Note.—Daily discharges determined from a well-defined curve between 700 and 18,600 second-liters. Values above and below these limits are estimated from extension of curve. Applicable from January to April 20, 1912.

*Daily and monthly discharges, in liters per second, of San Francisco River near San Francisco Bridge, Malinao, Albay, for the year 1919*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	.....	.....	1,646	1,154	476	597	1,206	825	1,104	1,154	4,845	3,953
2	.....	.....	1,646	1,154	462	914	3,252	740	914	1,055	4,662	3,400
3	.....	.....	1,425	1,104	476	740	1,635	740	825	1,104	4,126	3,878
4	.....	.....	1,425	1,104	740	629	1,206	1,260	740	1,007	3,958	3,454
5	.....	.....	1,425	1,055	740	567	1,104	1,055	663	1,104	3,790	6,226
6	.....	.....	1,315	1,055	869	567	869	1,702	663	1,425	4,754	4,302
7	.....	.....	1,206	1,104	914	597	825	1,646	700	1,206	5,306	3,958
8	.....	.....	1,104	960	663	914	825	1,260	740	1,315	6,042	3,178
9	.....	.....	1,206	1,104	540	2,238	782	1,535	1,590	1,646	3,958	2,900
10	.....	.....	1,535	1,315	597	1,480	663	1,425	2,432	1,760	4,126	2,900
11	.....	.....	1,315	1,206	663	960	663	1,055	2,432	1,598	3,678	3,178
12	.....	.....	1,315	1,206	597	1,007	597	2,058	1,102	1,598	3,104	3,326
13	.....	.....	1,206	1,206	597	960	597	1,104	1,007	1,878	3,104	3,326
14	.....	.....	1,206	1,206	597	476	663	1,104	1,007	1,878	3,104	3,326
15	.....	.....	1,104	1,104	597	540	597	1,104	1,007	1,878	3,104	3,326
16	.....	.....	1,154	1,104	540	540	597	869	1,646	2,623	8,526	2,496
17	.....	.....	1,206	1,154	540	540	597	825	3,038	1,998	6,134	2,900
18	.....	.....	1,206	1,104	567	482	567	825	6,134	1,760	6,686	3,874
19	.....	.....	1,206	1,055	540	495	663	825	2,623	1,760	6,225	4,214
20	.....	.....	1,315	1,055	540	740	1,104	3,252	1,998	2,696	4,478	4,662
21	.....	.....	1,154	914	540	567	914	2,496	1,818	2,058	3,958	3,634
22	.....	1,760	1,154	629	540	516	3,178	1,315	1,646	1,760	9,078	3,178
23	.....	1,646	1,206	540	516	495	1,260	1,206	1,480	1,590	4,302	2,900
24	.....	1,646	1,260	663	495	495	1,104	1,055	1,206	1,998	3,878	2,696
25	.....	1,760	1,154	597	495	516	825	914	1,206	3,104	3,178	2,868
26	.....	1,818	1,154	540	597	516	740	869	1,154	3,252	7,422	2,388
27	.....	1,760	1,206	516	869	1,104	914	1,104	1,480	2,178	4,570	2,304
28	.....	.....	1,206	495	740	825	1,055	1,104	1,260	2,623	4,570	2,304
29	.....	.....	1,206	495	740	825	1,055	1,104	1,260	2,623	4,570	2,304
30	.....	.....	1,260	495	597	.....	914	1,206	1,315	4,214	3,326	3,178
31	.....	.....	1,260	.....	.....	.....	914	1,206	.....	.....	.....	3,066
Maximum	.....	1,818	1,646	1,315	914	5,122	3,252	3,252	6,134	4,845	9,078	9,262
Minimum	.....	1,646	1,104	495	462	462	436	740	663	1,007	3,104	2,388
Mean	.....	1,719	1,267	948	609	931	1,029	1,237	1,763	2,096	4,885	3,797

NOTE.—Daily discharge determined from a fairly well-defined curve from 600 to 1,400 second-liters, applicable throughout the year.

*Daily and monthly discharges, in liters per second, of San Francisco River near San Francisco Bridge, Malinao, Albay,  
for the year 1920*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	2,496	1,878	2,058	1,104	825	587	825	462	1,104	462	663	9,446
2.....	3,036	1,760	2,118	1,260	663	700	914	462	540	448	663	8,342
3.....	2,496	1,702	2,304	1,206	587	587	825	462	597	476	1,646	6,960
4.....	3,790	1,535	2,238	1,104	567	567	462	448	540	2,900	2,868	8,710
5.....	3,252	1,546	2,058	1,007	540	516	435	435	476	1,055	1,890	9,354
6.....	3,674	1,546	1,998	1,007	540	516	629	437	462	1,007	1,815	6,674
7.....	3,036	1,535	1,878	1,104	540	495	597	437	437	1,206	1,007	3,634
8.....	2,432	1,370	1,760	1,154	567	435	435	428	825	597	914	3,400
9.....	3,104	1,260	1,760	1,154	567	435	435	428	825	597	914	2,668
10.....	3,036	1,260	1,646	1,154	700	567	540	428	540	540	964	2,764
11.....	3,634	1,425	1,535	1,206	960	567	663	428	597	567	1,007	2,560
12.....	2,832	1,535	1,480	1,535	740	540	914	437	597	540	1,206	2,304
13.....	5,396	1,535	1,480	1,535	663	435	663	437	597	2,560	2,178	1,760
14.....	3,878	2,496	1,315	1,007	587	428	540	437	435	5,396	2,338	1,760
15.....	4,126	3,606	1,878	960	825	428	435	540	435	4,392	1,938	3,556
16.....	3,036	3,874	2,118	825	825	418	435	1,154	462	2,738	1,702	3,178
17.....	3,790	3,036	1,760	825	825	418	435	1,154	462	1,206	1,590	2,686
18.....	3,326	2,900	1,702	825	825	418	435	1,154	462	1,206	1,590	2,304
19.....	2,900	2,900	1,702	825	825	418	435	1,154	462	1,206	1,590	2,118
20.....	2,496	2,496	1,535	825	825	418	435	1,154	462	1,206	1,590	1,660
21.....	2,496	2,496	1,535	825	825	418	435	1,154	462	1,206	1,590	1,535
22.....	2,568	2,496	1,425	825	825	418	435	1,154	462	1,206	1,590	1,535
23.....	2,568	2,178	1,315	825	825	418	435	1,154	462	1,206	1,590	1,535
24.....	2,238	2,118	1,260	960	540	412	428	462	1,590	1,014	1,315	1,206
25.....	2,178	2,238	1,315	914	435	418	422	462	1,590	1,014	1,315	1,206
26.....	2,058	2,238	1,315	914	435	418	422	462	1,590	1,014	1,315	1,206
27.....	1,998	2,238	1,206	914	435	418	422	462	1,590	1,014	1,315	1,206
28.....	2,878	2,636	1,154	1,878	540	435	428	1,203	516	1,702	2,668	1,646
29.....	2,058	2,304	1,154	1,878	540	435	428	1,203	516	1,702	2,668	1,646
30.....	2,238	.....	1,104	1,825	540	1,315	428	1,782	462	1,740	2,432	1,646
31.....	1,938	.....	1,104	.....	567	.....	428	960	.....	629	.....	1,646
Maximum.....	5,396	7,606	2,304	1,878	1,260	1,315	914	1,203	1,760	5,766	2,496	9,446
Minimum.....	5,878	1,260	1,104	663	435	410	422	428	437	1,357	1,446	1,446
Mean.....	2,900	2,295	1,629	1,022	665	511	539	609	739	1,357	1,537	3,245

NOTE.—Daily discharge determined from a fairly well-defined curve from 600 to 1,400 second-liters, applicable throughout the year.

*Daily and monthly discharges, in liters per second, of San Francisco River near San Francisco Bridge, Malinao, Albay, for the year 1921*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	2,980	9,855	8,340	3,730	700	550	900	1,000	3,045	1,510	5,130	3,450
2.....	5,690	5,130	8,340	3,520	700	600	850	1,000	2,110	1,590	5,690	3,520
3.....	3,110	3,110	9,080	2,590	600	1,570	1,330	900	1,870	1,570	8,240	3,600
4.....	2,410	3,590	9,080	2,350	2,350	1,510	8,340	800	1,690	3,520	6,050	3,600
5.....	2,290	2,980	8,560	2,290	2,290	1,430	2,350	900	1,510	1,590	4,570	4,570
6.....	1,930	2,520	15,100	2,170	3,545	1,330	2,350	1,000	1,270	1,450	7,980	3,520
7.....	1,690	3,110	16,350	2,170	2,915	1,270	2,350	1,000	1,450	1,450	11,340	3,110
8.....	1,690	3,110	16,350	2,170	2,915	1,270	1,570	1,000	1,450	1,450	11,340	3,110
9.....	1,690	3,110	16,350	2,170	2,915	1,270	1,570	1,000	1,450	1,450	11,340	3,110
10.....	1,570	3,240	11,140	2,050	2,590	1,215	1,570	1,330	1,570	1,450	17,840	2,590
11.....	1,270	3,110	7,350	2,050	2,350	1,105	1,215	1,160	2,110	1,750	10,840	2,590
12.....	1,510	2,850	5,050	1,930	2,290	1,000	1,215	1,000	4,080	8,540	7,740	2,655
13.....	1,270	3,110	4,430	1,750	2,170	1,000	2,290	1,000	2,850	3,590	6,540	3,800
14.....	1,450	3,110	3,870	1,570	2,170	1,000	1,690	1,000	1,990	3,240	4,550	7,350
15.....	2,170	2,915	4,080	1,450	1,990	900	1,215	1,000	1,830	4,655	3,840	4,650
16.....	3,310	2,720	5,050	1,330	1,810	1,270	1,215	900	2,855	3,240	3,800	3,660
17.....	2,470	3,380	4,360	1,160	2,230	1,450	1,215	700	2,050	2,530	3,590	3,450
18.....	2,110	4,080	4,360	1,000	1,430	1,690	1,690	700	2,050	2,110	3,590	3,450
19.....	5,930	6,720	4,290	900	5,390	1,690	2,215	700	1,570	2,290	3,770	3,450
20.....	2,110	1,170	4,010	800	2,380	1,690	2,215	600	1,570	2,290	3,770	3,450
21.....	2,655	9,300	4,010	800	2,380	1,690	2,215	600	1,570	2,290	3,770	3,450
22.....	2,785	9,300	3,940	800	2,380	1,690	2,215	600	1,570	2,290	3,770	3,450
23.....	2,350	12,975	3,870	900	1,690	1,570	1,810	500	1,390	2,290	8,140	4,150
24.....	2,050	14,100	3,870	900	1,215	1,330	1,750	500	1,450	2,655	9,840	3,730
25.....	1,810	11,980	3,870	2,410	1,105	1,215	1,570	500	1,330	2,655	6,720	3,660
26.....	1,930	8,340	3,870	1,570	1,105	1,050	1,215	400	2,980	3,175	10,740	13,270
27.....	2,410	8,040	3,940	1,105	1,000	1,330	1,050	400	2,980	3,175	8,040	12,470
28.....	2,410	8,040	3,870	900	900	1,510	1,000	450	4,430	2,590	5,850	6,820
29.....	3,730	.....	3,730	900	800	1,215	1,000	550	2,110	2,230	4,360	4,735
30.....	6,020	.....	3,730	800	650	1,050	1,000	750	1,690	2,915	3,870	4,885
31.....	6,190	.....	4,010	.....	500	1,050	950	3,730	.....	4,810	.....	4,300
Maximum.....	6,190	14,100	16,350	3,730	3,240	1,690	8,340	3,730	7,740	8,540	17,840	13,270
Minimum.....	2,410	2,720	4,360	1,000	600	1,000	850	912	1,215	1,330	3,175	2,590
Mean.....	2,560	5,914	6,492	1,678	1,793	1,267	1,805	1,000	2,176	2,651	6,706	4,667

NOTE.—Discharge determined from well-defined rating curve below 9,000 second-liters, applicable from December 25, 1921, to December 31, 1922.

*Daily and monthly discharges, in liters per second, of San Francisco River near San Francisco Bridge, Matinao,  
Albay, for the year 1922*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	3,900	3,410	1,955	2,545	1,270	265	640	...	...	...	...	6,995
2	3,650	12,670	1,775	2,545	1,350	325	835	...	...	...	...	8,090
3	2,965	7,845	1,595	2,345	1,120	445	1,510	...	...	...	...	5,660
4	3,410	5,345	1,595	2,445	900	385	835	...	...	...	...	7,710
5	3,410	4,735	1,775	1,955	535	1,270	705	...	...	...	...	8,870
6	3,185	4,585	1,865	1,955	705	970	705	...	...	...	...	12,670
7	3,410	4,165	1,775	1,955	575	705	445	...	...	...	...	10,070
8	2,965	3,775	1,775	1,955	575	445	445	...	...	...	...	6,650
9	3,410	3,650	1,595	1,955	705	445	510	...	...	...	...	5,660
10	3,185	3,410	1,430	1,775	770	325	3,650	...	...	...	...	4,735
11	12,070	2,855	1,430	2,545	705	325	2,145	...	...	...	...	4,165
12	11,870	2,965	1,595	2,545	705	325	770	...	...	...	...	4,440
13	11,870	2,855	1,430	2,545	770	325	575	...	...	...	...	3,775
14	8,090	2,855	1,595	3,295	770	325	445	...	...	...	...	4,300
15	18,470	2,645	1,955	2,750	835	205	325	...	...	...	...	3,410
16	14,870	2,845	3,075	2,545	835	205	325	...	...	...	...	4,735
17	8,870	2,145	2,545	2,750	1,270	265	...	...	...	...	...	2,145
18	7,710	2,145	2,545	2,965	770	325	...	...	...	...	...	2,060
19	5,150	2,145	4,440	2,750	705	2,090	...	...	...	...	...	11,270
20	5,500	2,145	2,965	2,855	1,195	705	...	...	...	...	...	15,670
21	4,585	2,145	2,965	2,445	2,965	835	...	...	...	...	...	1,595
22	4,030	2,245	2,145	2,050	2,145	770	...	...	...	...	...	19,070
23	3,900	2,245	2,145	1,595	1,510	575	...	...	...	...	...	41,070
24	3,410	2,145	2,145	1,510	970	575	...	...	...	...	...	7,710
25	3,075	1,955	1,955	1,595	705	575	...	...	...	...	...	5,345
26	3,295	1,955	1,955	1,595	705	575	...	...	...	...	...	4,300
27	4,030	1,955	21,670	1,595	1,120	575	...	...	...	...	...	3,900
28	4,300	1,865	5,985	1,595	705	510	...	...	...	...	...	11,870
29	3,530	1,865	4,165	1,595	640	325	...	...	...	...	...	22,270
30	3,410	...	3,410	1,430	640	325	...	...	...	...	...	13,070
31	3,410	...	3,075	1,430	445	705	...	...	...	...	...	17,070
					325	...	...	...	...	...	...	9,270
												14,070
Maximum.	18,470	12,670	21,670	3,995	2,965	2,090	3,650	...	...	...	22,270	41,070
Minimum.	2,965	1,865	1,430	1,430	325	205	984	...	...	...	1,595	3,410
Mean.	5,510	3,390	3,071	2,187	944	548	...	...	...	...	7,205	10,080

NOTE.—See footnote to daily discharge table for 1921. No record on days for which discharge is not given.

## ALBAY PROVINCE

## TOBGON RIVER, LIGAO

**LOCATION.**—About 11 km. northeast of the municipality of Ligao, between the barrios of Batang and Bubunsuran, and about 50 m. east of Tobgon Bridge on the Ligao-Tabaco Road.

**RECORDS AVAILABLE.**—From January 22, 1921, to March 31, 1922.

**GAGE.**—Standard metric board vertically fastened to a tree on the left bank of the river.

**DISCHARGE MEASUREMENTS.**—Made by wading.

**CHANNEL AND BANKS.**—One channel at all stages; straight for about 100 m. above and below the station. Bed of stream sandy and gravelly. Both banks low and covered with cogon grass.

**EXTREMES OF DISCHARGE.**—Maximum discharge recorded during period of observation, 43,340 second-liters on November 10, 1923; minimum discharge, 916 second-liters on August 30, 1921.

**DIVERSIONS.**—None.

**REGULATION.**—None.

**UTILIZATION.**—For irrigation purposes.

**ACCURACY.**—Gage read twice daily. Daily discharge determined from poorly defined rating curve.

*Discharge measurements of Tobgon River, near Tobgon, Ligao, Albay*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1921</b>				
January 22 . . . . .	O. Buenaventura . . . . .		1,564	
February 5 . . . . .	do. . . . .		1,843	
February 29 . . . . .	do. . . . .	.45	1,965	
March 9 . . . . .	do. . . . .	.52	3,104	
March 22 . . . . .	do. . . . .	.50	2,140	
May 18 . . . . .	S. Musa . . . . .	.48	1,119	
June 7 . . . . .	O. Buenaventura . . . . .	.48	1,869	
July 5 . . . . .	S. Musa . . . . .	.52	2,188	
August 6 . . . . .	Buchanan and Musa . . . . .	.40	1,176	
September 1 . . . . .	S. Musa . . . . .	.39	1,096	
September 2 . . . . .	O. Buenaventura . . . . .	.38	1,874	
September 2 . . . . .	do. . . . .	.38	2,631	
September 17 . . . . .	do. . . . .	.50	2,926	
September 21 . . . . .	do. . . . .	.54	2,514	
October 10 . . . . .	do. . . . .	.43	1,021	
October 12 . . . . .	do. . . . .	.46	3,116	
November 4 . . . . .	do. . . . .	.72	3,086	
December 23 . . . . .	do. . . . .	.68	2,437	
<b>1922</b>				
January 3 . . . . .	O. Buenaventura and S. Musa . . . . .	.46	2,437	
January 13 . . . . .	O. Buenaventura . . . . .	.52	3,015	
January 25 . . . . .	S. Musa . . . . .	.49	2,643	
January 26 . . . . .	O. Buenaventura . . . . .	.50	2,707	
February 3 . . . . .	S. Musa . . . . .	.54	3,607	
February 22 . . . . .	O. Buenaventura . . . . .	.48	2,645	
March 4 . . . . .	do. . . . .	.46	2,241	
March 22 . . . . .	do. . . . .	.45	2,235	

Daily and monthly discharges, in liters per second, of Tobgon River near Tobgon, Ligao, Albay, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1			1,595	2,105	1,785	1,885	1,995	1,505	1,345	1,345	4,245	
2			1,595	2,105	1,785	1,885	1,995	1,505	1,045	1,345	16,780	
3			1,595	2,105	1,785	1,885	6,555	1,425	1,265	1,345	7,430	
4			1,595	2,105	1,785	1,885	2,445	1,425	1,265	1,685	6,990	
5			1,595	2,105	1,785	1,885	2,565	1,425	1,190	1,685	7,890	
6			3,620	2,105	1,785	1,885	2,325	1,190	1,045	1,885	3,770	
7			7,430	2,105	1,785	1,885	2,325	1,115	1,190	1,685	4,590	
8			2,105	1,595	1,785	1,885	2,325	1,345	1,045	2,325	6,555	
9			2,325	1,595	1,785	1,885	2,105	1,885	1,045	1,685	7,430	
10			2,105	1,595	1,785	2,325	1,995	1,425	1,265	1,505	43,340	
11			2,105	1,595	1,785	1,885	1,995	1,505	1,345	1,505		
12			2,105	1,595	1,785	1,885	1,885	1,505	4,245	1,685	6,990	
13			2,105	1,595	1,785	2,215	1,855	1,190	2,565	1,505	7,890	
14			2,105	1,595	1,785	2,105	1,885	1,345	1,885	1,345	4,415	
15			3,620	1,595	1,785	2,105	1,885	1,045	2,325	1,505	6,990	
16			9,370	1,595	1,785	2,105	1,885	1,345	1,505	1,345		
17			2,810	1,595	1,785	2,105	2,215	1,190	2,105	1,345		
18			2,810	1,595	1,885	2,105	1,885	1,505	1,685	1,505		
19			4,085	1,595	1,785	2,105	1,885	1,345	1,685	1,345		
20			2,685	1,595	1,785	2,105	1,885	1,190	1,685	1,265		
21			2,685	1,595	1,785	2,105	1,885	1,265	2,565	1,595		
22			2,105	1,595	1,785	2,105	1,885	1,345	1,685	1,685		
23			2,105	1,595	1,595	2,105	1,885	1,685	1,425	1,885		
24			2,105	1,595	1,595	2,105	1,785	1,685	1,345	1,885		
25			2,105	1,595	1,595	2,105	1,685	1,190	1,505	1,345		
26			2,105	1,595	1,595	2,105	1,685	1,595	1,505	2,215		
27			2,105	1,595	1,595	2,105	1,685	1,425	1,765	1,685		
28			2,105	1,595	1,595	2,215	1,685	1,190	1,425	2,105		
29			2,105	1,595	1,595	2,105	1,685	1,345	1,505	1,505		
30			2,105	1,595	1,595	2,105	1,685	916	1,345	2,105		
31			2,105	1,595	1,595	2,105	1,635	1,190		2,810		
Maximum			9,370	2,105	1,885	2,810	6,555	1,885	4,245	2,810	43,340	
Minimum			1,595	1,595	1,595	1,885	1,685	916	1,045	1,265	4,245	
Mean...			2,680	1,714	1,733	2,062	2,160	1,360	1,627	1,561	9,020	

NOTE.—No records on days for which discharge not given. River could not be measured on November 11, 1921 due to flood.





## ANTIQUE PROVINCE

### SIBALOM RIVER, SIBALOM

**LOCATION.**—About 4.5 km. northeast of Sibalom and about 1 km. north of Post Km. 14 of the Sibalom-San Remigio Road.

**RECORDS AVAILABLE.**—From August 22, 1918, to July 15, 1922, with breaks from February 1 to May 12, 1919, and from September 26 to November 7, 1920. Also there are records available from June 1, 1910, to July 26, 1913, inclusive, at old station about 200 m. below present station.

**GAGE.**—Of two sections; one is a vertical rod graduated in centimeters nailed on to a support driven into the river bed; the other is a non-recording vertical staff mounted on a triangular staff anchored into the ground.

**DISCHARGE MEASUREMENTS.**—Made from raft at section about 40 m. below gage.

**CHANNEL AND BANKS.**—Channel straight for about 40 m. above and about 100 m. below gaging section. Right bank well protected from scour by high hills; left bank low and subject to overflow. At measuring section stream bed mostly of gravel and very shifting. Flow uniform.

**EXTREMES OF DISCHARGE.**—Maximum discharge recorded during period of observation, 1,162,570 second-liters on November 4, 1920; minimum discharge, 1,000 second-liters on May 13, 1912 and on January 20, 25, and 26, 1919.

**DIVERSIONS.**—None.

**REGULATION.**—None.

**UTILIZATION.**—For irrigation purposes.

**ACCURACY.**—Daily discharge for the years 1910 to 1913, unreliable. Daily discharge from new records determined from a well-defined curve. Gage read twice daily. The true heights for both the maximum and minimum discharges are mere approximations.

*Discharge measurements of Sibalom River, near Bubungan, Sibalom, Antique*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1910</b>				
May 6.....	R. D. Klise.....	25.32	6,479	.....
May 25.....	do.....	25.28	35,481	.....
June 2.....	do.....	25.48	15,516	.....
June 3.....	do.....	25.46	14,284	.....
June 4.....	do.....	25.49	15,489	.....
October 24.....	do.....	25.63	23,590	.....
October 25.....	do.....	25.62	19,990	.....
October 26.....	do.....	25.56	18,480	.....
November 22.....	do.....	25.49	27,450	.....
November 23.....	do.....	25.50	25,510	.....
December 15.....	do.....	25.81	17,570	.....
December 16.....	do.....	25.32	17,740	.....
December 17.....	do.....	25.27	18,980	.....
December 19.....	do.....	25.29	15,060	.....
December 20.....	do.....	25.26	11,780	.....

*Discharge measurements of Sibalom River, near Bubungan, Sibalom,  
Antique—Continued*

Date	Made by—	Gage height (meters)	Discharge (second- liters)	Remarks
<b>1911</b>				
February 15.	R. D. Kilse.	25 32	6,190	
March 16.	do.	25 05	2,060	
March 17.	do.	25 05	1,980	
March 18.	do.	25 04	2,020	
March 19.	do.	25 05	2,190	
March 20.	do.	25 07	2,590	
March 21.	do.	25 11	4,660	
March 22.	do.	25 06	2,110	
April 20.	do.	25 16	5,010	
April 21.	do.	25 09	3,380	
April 22.	do.	25 06	2,490	
April 23.	do.	25 07	2,520	
April 24.	do.	25 06	2,760	
April 25.	do.	25 08	3,080	
April 26.	do.	25 21	6,810	
June 15.	do.	25 56	29,070	
July 7.	do.	26 38	82,500	
July 16.	do.	26 53	114,340	
October 12.	do.	25 97	26,340	
October 13.	do.	26 03	31,170	
October 14.	do.	26 11	34,190	
October 15.	do.	26 08	32,820	
October 16.	do.	26 02	29,640	
October 17.	do.	26 04	30,070	
October 18.	do.	25 98	25,300	
December 6.	do.	25 38	3,500	
December 7.	do.	25 44	3,680	
December 8.	do.	25 45	3,440	
December 9.	do.	25 45	3,360	
December 10.	do.	25 44	3,240	
December 11.	do.	25 43	3,210	
December 12.	do.	25 45	3,700	
December 13.	do.	25 44	3,350	
<b>1912</b>				
June 20.	do.	26 25	11,430	
September 25.	do.	26 38	105,000	
November 10.	T. S. Lawrence	1 66	44,700	
November 11.	do.	1 63	43,950	
November 11.	do.	1 61	40,600	
<b>1913</b>				
January 15.	do.	1 12	5,600	
January 15.	do.	1 12	5,600	
January 16.	do.	1 12	5,600	
January 16.	do.	1 12	5,600	
February 5.	do.	1 15	7,500	
February 6.	do.	1 15	7,100	
February 6.	do.	1 13	6,300	
February 7.	do.	1 11	5,100	
February 7.	do.	1 12	5,100	
February 8.	do.	1 10	5,100	
February 8.	do.	1 10	4,600	
March 13.	do.	1 03	2,300	
March 13.	do.	1 03	2,300	
March 14.	do.	1 03	2,200	
March 14.	do.	1 03	2,300	
April 6.	do.	1 03	1,100	
April 6.	do.	1 03	1,200	
April 7.	do.	1 03	1,100	
April 7.	do.	1 03	1,200	
May 20.	do.	1 18	8,600	
May 20.	do.	1 18	9,700	
May 21.	do.	1 17	8,100	
May 21.	do.	1 17	7,700	
May 22.	do.	1 16	7,200	
June 18.	do.	1 50	36,400	
June 18.	do.	1 50	35,900	
September 21.	do.	1 38	29,700	

*Discharge measurements of Sibalom River, near Bubungan, Sibalom,  
Antique—Continued*

Date	Made by—	Gage height (meters)	Discharge (second- liters)	Remarks
<b>1920</b>				
January 21 . . . . .	T. Mendoza . . . . .	28.39	8,988	
February 19 . . . . .	do. . . . .	28.23	8,164	
March 4 . . . . .	do. . . . .	28.25	8,661	
April 7 . . . . .	do. . . . .	28.31	8,536	
July 3 . . . . .	do. . . . .	29.35	71,840	
September 8 . . . . .	do. . . . .	28.86	46,854	
November 6 . . . . .	do. . . . .	29.50	15,782	
December 19 . . . . .	do. . . . .	28.28	9,220	
December 20 . . . . .	do. . . . .	28.28	9,818	
December 22 . . . . .	do. . . . .	28.10	8,354	
<b>1921</b>				
January 8 . . . . .	do. . . . .	28.09	7,362	
January 13 . . . . .	do. . . . .	28.08	6,756	
March 5 . . . . .	do. . . . .	28.29	8,506	
March 7 . . . . .	do. . . . .	28.22	7,259	
May 22 . . . . .	do. . . . .	28.36	10,428	
May 24 . . . . .	do. . . . .	28.28	7,326	
June 24 . . . . .	do. . . . .	28.64	12,862	
August 26 . . . . .	do. . . . .	28.64	21,501	
August 27 . . . . .	do. . . . .	28.72	25,573	
October 27 . . . . .	do. . . . .	28.70	24,251	
December 23 . . . . .	do. . . . .	28.80	24,405	
<b>1922</b>				
January 19 . . . . .	do. . . . .	28.78	10,613	
February 22 . . . . .	do. . . . .	28.71	10,162	
March 22 . . . . .	do. . . . .	28.54	2,563	
April 18 . . . . .	do. . . . .	28.48	2,483	
June 21 . . . . .	do. . . . .	28.84	37,212	

NOTE.—Elevation of zero from November 10, 1911, and from January 21, 1920, referred to different data.

Daily and monthly discharges, in liters per second, of Sibalom River near Bubungan, Sibalom, Antique, for the year 1910

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.						19,000	28,000	18,000	47,000	56,000	.....	24,000
2.						18,000	25,000	18,000	32,000	.....	.....	24,000
3.						13,000	23,000	18,000	39,000	97,000	.....	23,000
4.						13,000	22,500	18,000	43,000	96,000	.....	23,000
5.						12,000	24,000	18,000	42,000	79,000	55,000	23,000
6.						11,000	27,000	18,000	40,000	70,000	52,000	23,000
7.						9,500	46,500	30,000	41,500	105,000	26,500	23,000
8.						9,500	38,000	28,500	41,500	55,000	25,000	23,000
9.						8,500	30,000	16,000	39,000	.....	22,000	23,000
10.						8,500	30,500	15,000	35,000	.....	22,000	23,000
11.						3,500	20,000	30,000	34,000	.....	24,000	23,000
12.						25,000	17,500	13,000	28,000	.....	29,000	19,000
13.						12,000	25,000	33,000	76,000	.....	30,000	18,000
14.						13,000	21,000	31,000	69,000	.....	26,500	17,000
15.						12,500	25,000	31,000	55,000	.....	25,000	16,000
16.						9,500	20,000	28,000	78,000	.....	26,500	17,000
17.						9,500	18,000	23,000	85,000	41,000	22,000	13,000
18.						9,500	17,000	23,000	51,000	45,000	23,000	13,000
19.						11,000	15,000	23,500	56,000	43,000	29,000	13,000
20.						12,500	13,000	38,000	58,000	35,000	26,500	11,000
21.						20,000	15,000	43,000	55,000	37,000	30,000	15,000
22.						39,000	13,000	30,000	44,000	33,000	30,000	13,000
23.						25,000	13,000	34,000	55,000	25,000	25,000	13,500
24.						45,000	28,500	38,000	62,000	25,000	25,000	19,000
25.						35,000	33,000	42,000	90,000	22,000	26,000	21,000
26.						32,000	29,000	43,000	92,000	19,000	26,000	13,000
27.						24,000	28,000	34,000	84,000	35,000	30,000	21,000
28.						36,000	19,000	31,000	255,000	37,000	30,000	21,000
29.						30,000	12,500	29,000	235,000	27,000	28,000	21,000
30.						40,000	13,000	25,000	.....	23,000	24,000	17,500
31.						.....	20,500	40,000	.....	26,000	.....	16,500
Maximum.						46,500	77,000	55,000	255,000	100,000	65,000	24,000
Minimum.						3,500	13,000	13,000	28,000	17,000	22,000	11,000
Mean.						19,117	24,790	28,581	66,931	34,870	28,537	18,790

NOTE.—No records for dates in which discharges are not given.

Daily and monthly discharges, in liters per second, of Sibalom River near Bubungan, Sibalom, Antique, for the year 1911

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	17,000	4,000	3,100	1,600	2,000	37,000	95,000	214,000	30,000	43,000	15,000	7,500
2.....	14,000	4,000	3,100	2,300	2,300	30,000	123,000	202,000	28,000	103,000	13,000	7,500
3.....	13,500	4,000	2,300	2,000	16,500	34,000	95,000	109,000	25,000	103,000	13,000	6,500
4.....	14,000	4,000	3,100	1,600	15,000	33,000	47,000	70,000	29,000	38,000	13,000	6,500
5.....	13,000	3,100	2,700	1,600	14,000	31,000	43,000	56,000	31,000	49,000	13,000	6,500
6.....	13,000	3,100	2,700	1,600	24,000	30,000	40,000	52,000	25,000	39,000	13,000	6,500
7.....	13,000	3,100	2,300	2,000	14,000	24,000	40,000	49,000	47,000	50,000	16,000	3,500
8.....	12,000	13,500	2,300	2,000	7,000	39,000	34,000	48,000	70,000	63,000	13,000	4,500
9.....	12,000	11,000	2,300	2,000	5,000	46,000	45,000	43,000	70,000	77,000	12,500	3,500
10.....	13,000	9,000	2,300	2,000	3,500	38,000	49,000	285,000	68,000	65,000	15,000	3,500
11.....	12,500	13,500	2,300	12,000	2,000	28,000	47,000	387,000	70,000	73,000	14,000	3,200
12.....	11,500	17,000	2,700	9,000	4,400	35,000	46,000	427,000	80,000	39,000	12,500	3,500
13.....	9,600	17,500	2,300	7,600	7,600	39,000	385,000	385,000	113,000	39,000	12,500	3,500
14.....	7,600	13,000	2,000	2,300	10,400	34,000	420,000	310,000	112,000	43,000	15,000	3,500
15.....	7,000	18,000	2,000	2,000	13,500	30,000	240,000	324,000	87,000	33,000	16,000	3,500
16.....	7,000	15,000	2,000	2,000	25,000	38,000	113,000	104,000	95,000	28,000	14,000	4,000
17.....	7,000	13,000	2,000	2,300	40,000	41,000	90,000	54,000	83,000	25,000	12,500	4,000
18.....	6,000	15,000	1,600	2,300	40,000	41,000	247,000	49,000	91,000	26,000	13,000	3,500
19.....	5,000	15,000	2,000	2,000	36,000	62,000	113,000	49,000	107,000	25,000	12,500	3,500
20.....	4,000	12,000	2,300	6,000	18,000	62,000	75,000	62,000	67,000	23,000	12,000	3,500
21.....	3,100	11,500	3,500	3,100	23,500	46,000	55,000	53,000	48,000	25,000	11,000	3,500
22.....	.....	10,000	2,300	2,000	25,500	40,000	54,000	43,000	34,000	20,000	15,000	3,500
23.....	.....	8,200	2,300	2,000	21,000	51,000	56,000	57,000	28,000	22,000	15,000	3,200
24.....	4,000	7,000	2,000	2,300	18,000	51,000	51,000	80,000	26,000	20,000	11,500	3,500
25.....	4,000	4,400	1,600	2,700	34,500	57,000	41,000	50,000	24,000	18,000	10,000	3,500
26.....	4,000	4,000	1,600	6,800	47,000	55,000	90,000	175,000	95,000	16,500	10,000	4,000
27.....	4,000	4,000	2,000	6,800	50,000	48,000	133,000	114,000	61,000	15,000	9,000	8,500
28.....	4,000	3,100	2,300	5,400	38,000	43,000	282,000	54,000	65,000	13,000	7,500	3,200
29.....	4,400	.....	2,000	2,700	37,000	35,000	430,000	48,000	80,000	21,000	6,500	3,200
30.....	3,500	.....	1,600	2,300	37,000	52,000	344,000	43,000	.....	18,000	6,500	3,000
31.....	4,000	.....	1,600	.....	36,500	.....	243,000	34,000	.....	15,000	.....	3,000
Maximum.....	17,000	18,000	3,500	12,000	50,000	92,000	430,000	427,000	113,000	103,000	15,500	7,500
Minimum.....	3,100	3,100	1,600	1,600	2,000	24,000	34,000	34,000	23,000	13,000	6,500	3,000
Mean.....	8,542	9,286	2,265	3,603	21,555	42,100	133,871	128,387	61,933	36,468	12,267	4,090

Nore.—No records for dates in which discharges are not given.

Daily and monthly discharges, in liters per second, of Sibulom River near Eubungan, Sibalom, Antique, for the year 1912

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	2,500				3,000	11,000	32,000	95,000	100,000	72,000	.....	39,000
2.....	2,500					11,000	31,000	98,000	100,000	69,000	.....	37,000
3.....	2,500				2,700	12,000	30,000	96,000	100,000	67,000	.....	34,000
4.....	3,000				1,100	14,000	47,000	93,000	105,000	77,000	.....	33,000
5.....	3,000				1,100	14,000	48,000	78,000	77,000	62,000	.....	31,000
6.....	3,000				1,100	17,000	47,000	66,000	76,000	58,000	.....	29,000
7.....	3,000					17,500	47,600	68,000	65,000	96,000	.....	30,000
8.....	3,000					17,500	40,000	61,000	150,000	74,000	.....	44,000
9.....	2,500				6,500	24,000	44,000	58,000	113,000	94,000	.....	40,000
10.....	2,500				7,000	24,000	55,000	59,000	105,000	94,000	45,000	36,000
11.....	2,500				3,500	20,000	47,000	58,000	93,000	91,000	42,000	33,000
12.....	2,500				1,500	19,000	46,000	59,000	88,000	84,000	39,000	30,000
13.....	3,500				1,000	24,000	41,000	140,000	88,000	88,000	37,000	26,000
14.....	3,000					21,000	40,000	130,000	106,000	71,000	32,000	23,000
15.....	2,500				5,000	22,000	45,000	104,000	130,000	68,000	32,000	23,000
16.....	2,500				4,000	24,000	45,000	87,000	175,000	.....	27,000	22,500
17.....	2,500				3,000	25,000	45,000	86,000	169,000	.....	29,000	22,000
18.....	2,700				4,300	22,000	102,000	83,000	103,000	.....	25,000	22,000
19.....	2,500					23,000	102,000	84,000	125,000	.....	25,000	21,000
20.....	2,500				3,000	25,000	110,000	85,000	140,000	.....	23,000	20,000
21.....	2,500				3,500	26,000	88,000	95,000	100,000	.....	23,000	19,000
22.....	2,700				3,000	27,000	84,000	80,000	98,000	.....	26,000	19,000
23.....	2,500				6,500	25,000	81,000	92,000	90,000	.....	26,400	17,000
24.....	2,500				7,300	23,000	75,000	100,000	100,000	.....	200,000	17,000
25.....	2,700				7,700	29,000	54,000	94,000	110,000	.....	113,000	16,000
26.....	2,800				6,500	26,000	49,000	113,000	100,000	.....	59,000	16,000
27.....	2,000				6,500	24,000	73,000	104,000	134,000	.....	115,000	20,000
28.....	1,500				7,000	25,000	91,000	100,000	108,000	.....	66,000	19,000
29.....	1,500				8,000	26,000	82,000	100,000	92,000	.....	66,000	17,000
30.....	1,100				14,000	.....	80,000	100,000	.....	.....	.....	16,000
31.....	3,500				14,000	29,000	150,000	140,000	175,000	96,000	200,000	44,000
Maximum.....	2,100				1,000	11,000	30,000	88,000	109,100	96,000	23,000	38,000
Minimum.....	1,500				4,622	21,300	61,500	85,000	.....	77,933	42,500	25,800
Mean.....												

NOTE.—No records for dates in which discharges are not given.

Daily and monthly discharges, in liters per second, of Sibalom River near Bubungan, Sibalom, Antique, for the year 1913

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	15,000	5,700	2,500	1,400	3,200	7,600	48,000					
2	15,000	5,700	3,500	1,300	2,000	7,100	76,000					
3	13,500	5,500	3,500		7,500	8,200	68,000					
4	18,500	9,000	3,700		6,000	7,200	77,000					
5	15,500	7,300	3,500	1,100	2,500	9,500	55,000					
6	15,500	6,500	2,700		57,000	24,000	55,000					
7	15,500	5,700	2,500	1,100	62,000		80,000					
8	15,500	4,500	2,700	1,400	38,000		61,000					
9	15,000	4,500	2,250	1,250	19,500	9,500	51,500					
10	17,500	4,000	2,250	1,100	16,500	18,000	65,000					
11	16,000	3,700	2,000		13,500	26,800	43,500					
12	15,500	4,000	2,000	13,500	12,000	24,800	32,000					
13	15,500	7,300	2,250	8,500	11,000	44,000	20,500					
14	15,500	4,500	2,250	16,000	12,000	28,500						
15	14,500	14,500	2,250	33,000	9,500	38,500						
16	5,500	11,200	2,000	10,000	8,500	38,500						
17	5,500	6,500	2,000	13,500	8,500	51,500	50,000					
18	9,000	4,500	2,300	16,000	8,500	32,000	67,000					
19	13,500	3,700	2,100	15,500	10,500	44,500	65,000					
20	9,500	3,700	2,100	14,000	9,300	46,000	58,000					
21	9,000	4,500	2,100	3,700	7,500	42,500	72,500					
22	8,000	4,000	1,900	2,800	7,000	30,000	74,000					
23	7,500	3,700	2,000	2,600	6,500	20,500	131,000					
24	6,000	3,500	2,100	2,500	8,000	44,500	161,000					
25	6,000	4,000	2,000	2,500	8,000	33,000	151,000					
26	5,500	3,500	2,000	2,400	7,000	48,000	110,000					
27	5,500	3,500	1,700	2,300	6,500	46,500						
28	5,500	3,500	1,700	2,300	6,000	21,500						
29	5,700		1,700	2,000	8,000	61,000						
30	9,000		1,600	1,900	8,000	7,000	44,500					
31	6,500		1,300		5,500							
Maximum	18,500	14,500	3,700	33,000	62,000	61,000	161,000					
Minimum	5,500	3,500	1,300	1,100	2,000	7,100	20,500					
Mean	11,300	5,400	2,340	6,679	12,700	29,200	72,696					

NOTE.—Records unreliable from July 27 to August 28 and from September 20 to November 18, 1913. No records for other dates in which discharges are not given.



Daily and monthly discharges, in liters per second, of Sibalom River near Bubungan, Sibalom, Antique, for the year 1918

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.	..	..	..	..	..	..	..	..	95,400	165,600	13,975	3,100
2.	..	..	..	..	..	..	..	..	68,553	160,000	9,875	3,100
3.	..	..	..	..	..	..	..	..	52,575	142,200	9,125	3,100
4.	..	..	..	..	..	..	..	..	44,675	276,100	8,000	2,500
5.	..	..	..	..	..	..	..	..	36,225	90,388	25,550	2,500
6.	..	..	..	..	..	..	..	..	107,100	53,400	6,950	3,700
7.	..	..	..	..	..	..	..	..	74,575	40,350	6,950	3,700
8.	..	..	..	..	..	..	..	..	64,775	33,550	5,950	3,100
9.	..	..	..	..	..	..	..	..	72,500	27,300	5,625	3,100
10.	..	..	..	..	..	..	..	..	133,100	22,725	5,625	2,800
11.	..	..	..	..	..	..	..	..	129,200	22,725	5,625	2,500
12.	..	..	..	..	..	..	..	..	78,875	34,875	9,125	2,500
13.	..	..	..	..	..	..	..	..	51,750	29,100	10,250	2,500
14.	..	..	..	..	..	..	..	..	40,350	19,600	8,000	2,500
15.	..	..	..	..	..	..	..	..	29,100	29,100	6,275	2,500
16.	..	..	..	..	..	..	..	..	21,800	33,400	5,275	2,500
17.	..	..	..	..	..	..	..	..	21,875	24,000	5,275	2,500
18.	..	..	..	..	..	..	..	..	19,600	40,350	5,625	2,500
19.	..	..	..	..	..	..	..	..	17,625	40,350	5,625	1,900
20.	..	..	..	..	..	..	..	..	14,850	40,350	5,625	1,900
21.	..	..	..	..	..	..	..	..	38,250	62,000	4,975	1,900
22.	..	..	..	..	..	..	..	..	36,225	146,100	4,975	1,600
23.	..	..	..	..	..	..	..	..	62,000	57,650	4,975	1,600
24.	..	..	..	..	..	..	..	..	95,400	148,700	4,975	1,600
25.	..	..	..	..	..	..	..	..	46,237	35,550	4,650	1,900
26.	..	..	..	..	..	..	..	..	64,775	27,900	23,500	64,250
27.	..	..	..	..	..	..	..	..	100,600	40,350	4,325	16,575
28.	..	..	..	..	..	..	..	..	127,900	19,100	3,700	6,275
29.	..	..	..	..	..	..	..	..	103,200	23,300	3,700	3,000
30.	..	..	..	..	..	..	..	..	62,500	59,375	3,700	3,475
31.	..	..	..	..	..	..	..	..	61,125	90,388	.....	5,625
Maximum.	..	..	..	..	..	..	..	..	133,100	276,100	25,550	54,250
Minimum.	..	..	..	..	..	..	..	..	46,237	14,850	3,700	1,600
Mean.	..	..	..	..	..	..	..	..	78,631	71,373	6,999	5,226

NOTE.—As there were no measurements made during this year, the 1920 gagings were made applicable to the gage heights recorded.

Daily and monthly discharges, in liters per second, of Sibalom River near Bubungan, Sibalom, Antique, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	5,300					7,650	34,875	38,950	150,000	17,625	36,900	17,150
2.....	4,975					4,975	195,500	36,225	70,500	17,625	24,975	16,675
3.....	4,650					7,650	134,400	86,625	41,775	15,750	16,675	16,200
4.....	4,325					10,250	33,400	299,500	33,550	13,350	17,625	27,900
5.....	4,325					13,975	28,500	147,400	27,300	11,850	16,200	66,650
6.....	4,000					22,725	50,925	155,200	23,500	13,975	15,750	83,275
7.....	3,700					38,950	49,320	111,000	27,300	18,600	13,125	26,125
8.....	3,700					19,600	28,500	134,400	49,320	13,975	9,125	27,300
9.....	3,100					21,150	22,725	108,200	81,025	147,400	27,300	22,750
10.....	3,100					146,100	19,600	95,400	39,650	152,600	27,300	21,675
11.....	3,100					267,000	32,250	168,000	35,550	104,500	18,100	18,700
12.....	2,500					159,100	22,250	118,800	75,650	50,925	23,300	16,675
13.....	2,200					47,775	66,650	168,000	194,200	137,000	28,500	18,700
14.....	1,900				4,325	27,300	59,375	122,700	129,100	267,000	17,625	14,950
15.....	1,900				13,125	19,100	33,550	76,725	129,100	267,000	17,625	12,275
16.....	1,900				7,300	14,850	38,950	64,250	68,550	98,000	24,975	10,650
17.....	1,900				13,550	13,125	61,125	86,225	48,550	34,875	29,725	16,200
18.....	1,900				7,300	9,875	44,675	155,200	37,675	46,475	26,125	16,200
19.....	1,900				7,650	12,250	49,320	163,000	39,650	34,875	24,975	18,700
20.....	1,600				4,325	14,850	50,925	98,000	32,250	26,125	28,500	14,400
21.....	1,600				3,700	14,850	50,925	98,000	37,675	22,750	24,975	16,200
22.....	1,600				3,100	11,450	98,000	43,950	33,550	22,750	27,300	16,200
23.....	1,600				4,975	13,125	91,625	40,350	37,675	26,125	27,300	16,200
24.....	1,600				8,375	8,375	66,650	34,200	22,200	26,125	20,625	12,275
25.....	1,000				9,125	144,800	34,200	36,225	17,625	29,725	12,700	9,500
26.....	1,000				10,650	30,975	126,600	36,225	24,975	34,200	33,250	9,125
27.....					11,450	17,625	170,800	32,250	17,625	24,975	27,900	8,000
28.....					8,000	13,975	90,388	178,500	18,100	26,125	27,900	5,625
29.....					6,930	12,275	66,650	150,000	194,200	267,000	36,900	83,275
30.....					6,930	12,275	66,650	299,500	17,625	11,850	9,125	6,625
31.....					6,930	12,275	66,650	98,059	53,598	60,021	22,624	19,254
Maximum.....	5,300				13,550	267,000	195,500	299,500	194,200	267,000	36,900	83,275
Minimum.....	1,000				1,900	4,975	19,600	27,300	17,625	11,850	9,125	6,625
Mean.....	2,706				7,375	35,065	66,899	98,059	53,598	60,021	22,624	19,254

NOTE.—The gatings made in 1920 were made applicable to the gage heights of this year. No records of gage heights for dates in which discharges are not given.

Daily and monthly discharges, in liters per second, of Sibalom River near Bubungan, Sibalom, Antique, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	11,050	6,275	10,650	5,300	10,650	17,625	146,100	30,975	182,500	.....	.....	18,540
2	11,450	4,975	4,975	5,300	9,975	20,625	36,225	45,975	202,000	.....	.....	19,855
3	12,275	4,975	4,975	7,300	7,300	26,500	52,575	35,550	150,000	.....	.....	30,150
4	12,700	4,325	4,950	7,650	7,300	36,900	108,400	40,350	98,000	.....	.....	17,580
5	13,975	4,650	4,325	6,275	6,275	34,200	202,000	30,975	75,650	.....	.....	1,162,570
6	13,125	4,975	3,100	5,950	17,150	30,975	124,000	26,700	30,350	.....	.....	1,505,070
7	11,450	10,650	3,700	5,625	10,650	27,900	28,500	25,550	82,250	.....	.....	6,060
8	11,450	4,325	3,400	6,275	10,650	27,900	61,125	30,975	30,975	.....	.....	17,330
9	10,250	4,325	3,100	5,625	7,650	25,550	204,800	49,325	26,125	.....	.....	13,835
10	10,650	4,000	3,100	5,625	8,000	25,550	68,850	47,000	26,700	.....	.....	20,300
11	8,000	3,700	3,100	6,600	7,300	25,550	120,100	33,550	23,850	.....	.....	15,060
12	8,000	3,700	3,400	7,300	23,850	26,700	112,300	26,125	21,875	.....	.....	8,420
13	13,125	4,000	3,100	6,950	13,125	26,700	100,600	19,100	24,975	.....	.....	11,870
14	9,125	3,700	3,400	7,650	21,150	32,900	27,500	24,975	55,650	.....	.....	11,340
15	7,650	3,700	3,400	6,600	23,850	23,725	18,600	24,975	56,150	.....	.....	14,130
16	7,650	3,100	3,700	6,600	17,625	23,725	18,600	20,100	56,150	.....	.....	19,810
17	7,650	3,100	3,700	6,600	17,625	23,725	18,600	20,100	56,150	.....	.....	8,780
18	10,650	3,700	2,800	6,275	21,975	22,200	32,250	34,200	34,275	.....	.....	8,870
19	9,125	3,700	3,100	5,950	21,150	22,200	33,550	33,225	56,800	.....	.....	8,000
20	10,650	3,700	3,700	5,950	21,150	19,600	34,875	113,650	111,000	.....	.....	22,390
21	10,650	3,700	4,000	5,950	20,625	19,100	33,550	87,975	46,237	.....	.....	9,320
22	8,375	3,100	3,100	5,950	18,600	20,100	28,500	40,350	39,650	.....	.....	6,975
23	9,125	3,100	3,100	6,275	14,350	20,625	30,350	68,550	37,575	.....	.....	12,980
24	7,650	2,500	6,600	6,275	18,600	19,100	30,975	75,650	278,700	.....	.....	12,700
25	7,300	3,100	6,275	5,300	17,150	23,300	27,300	36,225	770,100	.....	.....	6,780
26	7,650	3,700	6,275	8,375	18,600	23,900	26,125	37,575	853,300	.....	.....	13,540
27	8,000	3,700	6,950	7,300	16,200	30,975	24,975	30,975	.....	.....	.....	11,870
28	6,275	3,700	6,950	6,950	17,150	23,900	126,600	30,975	.....	.....	.....	12,980
29	5,950	3,700	6,275	7,300	19,600	139,600	55,250	32,250	.....	.....	.....	8,780
30	6,275	.....	6,600	8,375	19,600	149,900	54,250	62,200	.....	.....	.....	6,480
31	4,650	.....	5,950	8,375	16,675	140,900	30,975	147,400	.....	.....	.....	6,420
Maximum	13,975	10,650	10,650	8,375	24,975	273,500	204,600	147,400	853,300	.....	.....	37,100
Minimum	4,650	2,500	2,800	5,300	6,275	17,625	18,600	19,100	21,875	.....	.....	6,060
Mean	9,416	4,123	4,615	6,609	15,676	41,925	66,269	44,831	132,440	.....	.....	12,836

Note.—Daily discharge determined from a fairly well-defined curve from 4,000 to 72,000 second-liters. Gage washed out during the dates in which discharges are not given.

Daily and monthly discharges, in liters per second, of Sibalom River near Bubungan, Sibalom, Antique, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	10,310	10,565	12,145	10,310	6,240	21,960	12,700	20,300	37,300	30,680	27,080	25,103
2	7,990	8,210	14,750	8,420	6,060	13,260	12,135	17,330	25,130	36,460	23,270	27,080
3	6,975	7,375	13,835	10,820	6,240	8,000	13,540	17,330	30,680	31,220	23,270	28,080
4	6,600	9,560	11,340	9,560	8,000	8,420	25,600	36,460	62,920	32,860	25,600	26,580
5	7,580	11,080	10,310	9,560	13,260	7,990	30,680	36,460	36,460	33,440	30,150	25,600
6	6,420	10,055	8,645	8,870	10,565	8,210	19,510	84,270	34,020	34,620	25,600	23,720
7	7,375	9,095	8,210	8,000	10,820	11,080	12,135	37,100	34,020	29,620	25,600	24,760
8	6,420	7,375	8,870	6,975	12,380	14,440	16,660	30,680	32,310	29,100	22,390	24,190
9	6,420	8,000	7,375	6,420	11,885	11,605	19,905	23,723	43,620	28,580	27,580	22,820
10	6,780	7,580	6,975	6,240	10,820	14,130	20,300	18,050	29,620	22,820	128,980	24,560
11	9,095	7,170	6,600	6,780	8,000	22,620	12,700	23,300	115,880	30,680	148,705	20,300
12	9,560	7,170	9,320	7,170	8,210	24,660	11,870	19,510	277,475	31,220	57,500	22,390
13	7,990	6,600	7,580	9,560	8,870	29,620	22,390	17,330	184,210	32,860	34,020	18,410
14	7,375	7,580	6,600	8,000	14,130	37,100	14,130	13,885	97,420	21,960	34,020	19,905
15	6,600	7,990	7,580	8,645	20,300	41,900	16,660	14,130	35,850	27,080	31,760	26,580
16	6,600	7,170	23,720	7,990	24,660	58,530	22,820	17,330	35,850	27,080	31,760	26,580
17	6,975	7,170	20,700	7,375	19,905	32,860	28,080	12,980	29,620	27,580	26,580	20,700
18	6,780	7,170	19,510	8,210	18,770	24,660	90,845	14,750	28,580	33,440	28,080	20,300
19	7,580	6,600	14,440	7,990	22,390	19,510	168,430	12,420	38,410	29,620	23,620	21,100
20	6,240	11,340	11,340	6,975	17,330	20,300	131,610	19,140	32,310	28,080	23,580	20,300
21	6,600	10,565	14,130	7,170	12,135	29,620	15,550	15,060	35,850	32,310	27,580	18,770
22	6,240	12,420	8,645	7,990	6,975	29,620	64,000	26,080	32,310	31,220	30,680	30,680
23	6,420	13,420	9,095	10,310	11,870	29,620	44,090	21,530	32,720	30,680	30,150	31,760
24	7,580	13,580	9,095	8,420	9,800	31,760	29,100	18,770	21,960	25,600	52,575	28,580
25	7,375	23,300	7,990	10,055	9,560	12,700	26,080	20,700	24,660	23,720	109,255	35,240
26	7,375	19,140	7,580	9,560	9,800	16,660	22,820	29,620	22,390	21,530	30,680	34,620
27	7,990	18,410	7,375	8,420	8,870	11,870	20,300	35,240	23,270	21,100	32,310	31,760
28	10,565	10,820	10,820	7,375	10,820	10,565	34,630	37,740	28,580	21,960	30,680	29,620
29	12,700	10,310	10,310	6,600	8,870	11,080	29,620	37,740	30,680	30,150	30,150	26,580
30	9,560	...	8,000	...	14,440	...	26,090	36,460	...	20,300	...	25,600
31	12,700	20,300	23,720	10,820	21,660	58,530	168,430	84,270	277,475	36,460	148,705	35,240
Maximum	6,240	6,600	6,600	6,240	6,060	7,990	11,870	12,420	21,960	36,460	148,705	35,240
Minimum	6,240	6,600	6,600	6,240	6,060	7,990	11,870	12,420	21,960	36,460	148,705	35,240
Mean	7,964	10,002	10,833	8,251	12,076	21,404	34,631	25,208	51,002	28,164	41,401	25,370

NOTE.—Discharge determined from well-defined rating curve below 140,000 second-liters.

Daily and monthly discharges, in liters per second, of Sibalom River near Bubungan, Sibalom, Antique, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	15,715	12,750	8,250	7,500	6,800	40,500	18,470	..	..	..	..	..
2.....	11,430	14,685	5,765	7,875	11,430	21,950	55,500	..	..	..	..	..
3.....	7,500	8,250	6,450	6,800	12,750	32,600	387,200	..	..	..	..	..
4.....	11,855	13,220	7,875	5,765	12,750	40,500	438,500	..	..	..	..	..
5.....	7,875	10,600	6,450	4,160	18,470	18,470	400,700	..	..	..	..	..
6.....	7,875	6,800	6,800	3,860	19,620	18,470	276,500	..	..	..	..	..
7.....	5,765	6,800	5,430	4,470	17,915	19,045	182,000	..	..	..	..	..
8.....	6,450	6,800	4,160	3,860	14,190	16,250	168,800	..	..	..	..	..
9.....	10,185	7,500	4,470	4,470	19,620	15,180	168,500	..	..	..	..	..
10.....	9,000	3,875	4,470	5,765	13,470	16,805	522,500	..	..	..	..	..
11.....	16,100	6,860	3,280	2,430	13,705	11,800	14,700	..	..	..	..	..
12.....	18,185	5,105	5,105	6,100	15,180	11,800	160,400	..	..	..	..	..
13.....	8,250	11,855	7,500	6,100	15,180	11,855	66,200	..	..	..	..	..
14.....	7,500	8,625	7,500	5,105	19,620	8,625	53,300	..	..	..	..	..
15.....	8,250	5,430	7,150	3,280	13,705	8,250	..	..	..	..	..	..
16.....	14,190	3,280	6,800	4,780	14,685	16,250	..	..	..	..	..	..
17.....	14,190	7,875	8,625	2,725	13,220	15,715	..	..	..	..	..	..
18.....	13,220	4,780	6,450	3,000	16,805	17,360	..	..	..	..	..	..
19.....	11,430	5,765	5,430	6,450	16,250	21,950	..	..	..	..	..	..
20.....	13,220	4,160	6,100	5,105	31,110	20,770	..	..	..	..	..	..
21.....	11,430	4,160	4,470	5,105	670,700	19,620	..	..	..	..	..	..
22.....	10,185	4,160	4,160	7,150	1,008,200	18,470	..	..	..	..	..	..
23.....	15,715	7,150	3,280	7,875	400,700	16,250	..	..	..	..	..	..
24.....	17,915	6,800	4,470	6,800	214,200	24,400	..	..	..	..	..	..
25.....	15,180	6,450	5,105	6,100	75,700	35,580	..	..	..	..	..	..
26.....	16,250	8,250	4,470	6,450	23,025	21,950	..	..	..	..	..	..
27.....	11,855	5,625	7,765	7,230	29,045	18,470	..	..	..	..	..	..
28.....	13,915	5,765	6,800	7,150	22,500	15,180	..	..	..	..	..	..
29.....	6,100	..	6,100	6,100	17,915	16,250	..	..	..	..	..	..
30.....	6,100	..	5,105	6,100	17,915	..	..	..	..	..	..	..
31.....	6,100	..	5,105	..	..	..	..	..	..	..	..	..
Maximum	17,915	14,685	8,625	8,250	1,008,200	40,500	522,200	..	..	..	..	..
Minimum	5,765	3,280	2,725	2,725	6,800	7,500	18,470	..	..	..	..	..
Mean	10,639	7,731	5,763	5,682	91,072	19,411	226,004	..	..	..	..	..

NOTE.—See footnote to daily discharge for 1921.

## ANTIQUE PROVINCE

## TIPULUAN RIVER, SIBALOM

LOCATION.—About 800 m. east of the town of Sibalom and about 250 m. southeast of Sibalom—San Remigio Road.

RECORDS AVAILABLE.—From July 17, 1919, to December 31, 1922.

GAGE.—Inclined staff gage graduated with nails and an auxilliary vertical piece set at right bank of river.

DISCHARGE MEASUREMENTS.—Made by wading at section of gage.

CHANNEL AND BANKS.—Channel is straight for 40 m. above and for more than 300 m. below gaging section. Right bank low and subject to overflow; left bank high. At measuring section stream bed composed largely of gravel and shifting. Flow variable.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation 1,934,500 second-liters on July 10, 1922; minimum discharge, 130 second-liters on April 9–11, 1920.

DIVERSIONS.—There is one above, utilized for power and for irrigating rice fields.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge determined from fairly well-defined curves. Gage read twice daily.

*Discharge measurements of Tipuluan River, near Sermon, Sibalom, Antique*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1919</b>				
August 22 . . . . .	T. Mendoza . . . . .	1 49	31,175	.....
September 5 . . . . .	.. do. . . . .	1 28	19,425	.....
October 2 . . . . .	.. do. . . . .	1 28	21,171	.....
October 23. . . . .	.. do. . . . .	1 18	13,625	.....
<b>1920</b>				
January 4. . . . .	.. do. . . . .	86	1,125	.....
January 23 . . . . .	.. do. . . . .	73	1,368	.....
February 19 . . . . .	.. do. . . . .	63	327	.....
March 5 . . . . .	.. do. . . . .	60	239	.....
April 8 . . . . .	.. do. . . . .	55	178	.....
June 7 . . . . .	.. do. . . . .	1 26	9,485	.....
July 6 . . . . .	.. do. . . . .	55	8,921	.....
September 7 . . . . .	.. do. . . . .	55	14,961	.....
September 9 . . . . .	.. do. . . . .	50	11,852	.....
October 30. . . . .	.. do. . . . .	60	9,380	.....
November 10 . . . . .	.. do. . . . .	1 29	28,628	.....
November 11. . . . .	.. do. . . . .	1 15	13,653	.....
December 20 . . . . .	.. do. . . . .	1 05	4,826	.....
December 21 . . . . .	.. do. . . . .	1 04	4,164	.....
<b>1921</b>				
January 10. . . . .	.. do. . . . .	97	1,246	.....
March 4 . . . . .	.. do. . . . .	97	370	.....
March 8 . . . . .	.. do. . . . .	96	337	.....
March 9 . . . . .	.. do. . . . .	96	420	.....
May 21. . . . .	.. do. . . . .	1 10	616	.....
May 23 . . . . .	.. do. . . . .	1 02	509	.....
June 28. . . . .	.. do. . . . .	1 27	2,523	.....
June 25 . . . . .	.. do. . . . .	1 25	2,298	.....
August 24. . . . .	.. do. . . . .	1 33	7,458	.....
August 25 . . . . .	.. do. . . . .	1 38	7,829	.....
October 26. . . . .	.. do. . . . .	1 48	18,646	.....
December 22 . . . . .	.. do. . . . .	1 58	3,562	.....
December 26 . . . . .	.. do. . . . .	1 56	2,965	.....

*Discharge measurements of Tipuluan River, near Sermon, Sibalom,  
Antique—Continued*

Date	Made by—	Gage height (meters)	Discharge (second- liters)	Remarks
<b>1922</b>				
January 18... ..	T. Mendoza	1 41	1,677	.....
January 20... ..	..do. ....	1 45	1,889	.....
February 21... ..	..do. ....	1 31	1,381	.....
March 21... ..	..do. ....	1 28	268	.....
March 23... ..	..do. ....	1 27	255	.....
April 17... ..	..do. ....	1 25	216	.....
May 20... ..	..do. ....	1 66	56,551	.....
May 24... ..	..do. ....	1 76	61,055	.....
June 20... ..	..do. ....	1 80	42,564	.....
June 20... ..	..do. ....	1 75	39,165	.....
August 20... ..	..do. ....	1 72	58,896	.....
October 31	C. Q. Tumangday	1 56	9,698	.....
November 16... ..	..do. ....	1 70	24,081	.....

NOTE.—Measured at different sections.

Daily and monthly discharges, in liters per second, of Tipuluan River near Sermon, Sibadom, Antique, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....								28,000	48,500	25,000	12,700	3,900
2.....								22,200	31,900	14,050	7,250	3,400
3.....								64,600	19,300	12,350	10,900	3,250
4.....								94,650	15,400	9,900	6,850	10,900
5.....								45,800	14,950	17,700	5,950	26,750
6.....								52,100	15,850	12,000	6,400	38,750
7.....								29,850	19,300	13,000	6,650	21,700
8.....								27,400	18,200	37,500	8,150	15,400
9.....								45,000	60,100	47,600	37,100	8,750
10.....								32,600	21,200	81,050	11,600	7,900
11.....								45,000	19,700	18,650	8,150	7,350
12.....								26,750	39,600	14,950	25,600	6,650
13.....								58,400	59,200	72,550	12,000	6,400
14.....								47,600	43,100	109,500	9,600	6,400
15.....								35,500	30,500	83,600	13,200	5,950
16.....								21,200	27,400	30,500	10,250	5,500
17.....							30,500	20,650	40,400	20,200	7,350	4,850
18.....							25,600	19,300	21,200	18,200	8,700	4,700
19.....							29,850	39,600	17,200	19,300	7,600	4,500
20.....							49,400	61,000	25,000	16,300	6,850	4,500
21.....							44,000	49,400	28,600	10,900	6,650	4,500
22.....							43,100	62,800	25,000	9,300	4,500	4,500
23.....							66,400	19,300	18,200	12,000	25,000	4,500
24.....							44,000	16,750	14,050	13,200	5,950	4,500
25.....							29,850	15,850	13,600	15,400	4,850	4,500
26.....							53,000	18,650	12,700	12,700	4,700	4,500
27.....							58,400	15,850	12,000	13,000	12,700	4,500
28.....							55,700	16,300	31,900	12,350	12,700	4,500
29.....							45,000	31,900	39,600	8,750	4,850	4,300
30.....							31,900	77,850	15,400	12,700	4,500	3,900
31.....							25,600	55,700				3,400
Maximum.....							66,400	94,650	60,100	109,500	37,100	38,750
Minimum.....							25,600	15,850	12,000	8,750	4,500	3,250
Mean.....							42,153	38,631	26,663	22,551	10,313	7,926



Daily and monthly discharges, in liters per second, of Tipuluan River near Sermon, Sibalom, Antique, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	2,240	740	410	240	690	1,870				76,225	15,700	400
2	2,230	740	410	210	450	1,870				29,560	15,700	13
3	2,020	740	410	210	330	2,930				19,960	197,390	10,750
4	1,910	640	410	210	300	3,240				18,500	545,740	11,600
5	1,810	640	370	180	920	17,720				13,150	899,490	46,990
6	1,610	640	370	180	1,050	3,730				10,750	256,990	15,390
7	1,610	640	370	150	640	12,260				17,050	205,490	14,370
8	1,190	1,120	370	150	540	8,510			15,025	32,050	134,490	28,660
9	1,520	1,120	410	130	740	17,170			11,950	32,050	46,990	28,380
10	1,440	640	450	130	2,320	13,230			13,150	23,650	19,740	16,390
11	1,520	640	450	130	8,220	12,120			12,150	23,650	13,900	11,600
12	1,430	640	450	180	8,200	9,120			16,375	52,975	5,550	3,260
13	1,430	590	410	640	5,600	9,130			15,700	80,100	1,970	2,370
14	1,270	590	410	490	15,590	8,510			17,050	83,200	9,900	950
15	1,120	590	450	490	4,500	11,780			17,050	86,300	6,900	1,260
16	1,120	590	540	450	3,250	16,620			17,050	41,350	4,300	1,660
17	1,120	540	370	410	2,370	9,130			22,150	33,600	1,970	1,260
18	1,050	540	370	370	3,490	8,510			22,900	33,600	4,300	4,300
19	1,050	540	370	300	2,590	17,050			17,050	26,795	1,950	1,950
20	980	540	330	300	2,710	17,050			15,700	21,400	660	3,260
21	980	490	330	270	2,590	17,660			15,700	13,150	400	2,800
22	920	490	330	240	2,240	11,330			210,300	7,450	950	2,370
23	920	490	300	240	1,810	13,870			138,225	10,200	660	2,370
24	920	450	300	240	2,020	22,120			64,600	8,550	950	2,370
25	860	450	300	300	1,910	28,170			49,100	18,500	1,600	1,600
26	860	450	270	370	1,810	33,120			32,090	18,500	1,600	1,600
27	860	450	270	450	1,710	128,820			32,475	18,500	960	1,600
28	740	410	270	450	1,430	128,820			32,000	17,050	400	1,600
29	740	410	240	860	1,430	128,820			210,300	86,300	545,740	46,990
30	740	1,190	540	860	15,590	128,820			11,950	7,450	400	400
31	740	614	369	309	2,748	15,839			41,005	29,775	60,463	7,605
Maximum	2,240	1,190	540	860	15,590	128,820			210,300	86,300	545,740	46,990
Minimum	740	410	240	130	300	1,870			11,950	7,450	400	400
Mean	1,293	614	369	309	2,748	15,839			41,005	29,775	60,463	7,605

NOTE—Gage destroyed during dates of no record.

Daily and monthly discharges, in liters per second, of Tipuluan River near Sermon, Sibalom, Antique, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.		410	380	300	280	640	1,490	1,780	9,250	5,085	6,200	17,450
2		410	380	300	280	790	1,320	2,000	8,380	6,520	6,200	16,700
3		380	300	300	350	595	1,320	2,365	13,350	13,350	6,520	16,000
4		445	380	380	410	445	7,570	5,345	10,150	10,150	7,570	15,300
5		445	350	380	350	380	2,110	18,950	12,200	11,150	7,200	14,650
6		380	350	325	350	325	2,110	19,750	10,150	20,600	6,860	14,650
7		380	325	325	410	300	6,860	12,750	16,700	14,650	6,200	14,650
8		380	325	325	300	515	3,520	7,570	9,250	12,200	6,200	14,000
9		350	325	300	300	595	2,650	6,860	17,450	14,650	6,860	14,000
10		325	325	300	300	515	2,365	5,085	36,300	13,350	74,200	18,350
11		325	325	300	280	1,030	2,110	4,120	39,300	14,650	213,200	18,350
12		325	325	300	280	1,490	2,110	3,155	40,900	16,000	53,450	18,350
13		325	325	300	280	1,490	2,365	2,815	32,300	12,750	29,850	18,350
14		325	325	325	325	8,380	2,365	2,650	31,050	10,150	18,950	18,350
15		325	325	325	1,100	10,150	2,365	17,450	15,300	11,150	16,000	18,350
16		325	380	325	2,365	5,085	2,110	2,365	15,300	13,350	18,950	12,750
17		325	350	325	2,365	5,085	2,365	2,110	12,750	11,150	13,350	12,200
18		325	380	325	18,950	2,365	5,085	2,365	10,150	10,150	13,350	12,200
19		325	380	325	18,950	2,365	2,365	2,365	10,150	10,150	22,400	12,200
20		325	325	325	900	2,365	286,500	1,890	9,250	16,000	17,450	12,200
21		410	325	325	740	2,110	132,300	16,000	8,380	12,200	17,450	12,200
22		445	325	325	515	2,500	226,400	5,605	9,250	10,150	16,700	12,200
23		380	325	325	445	2,365	132,300	3,910	9,250	9,250	16,700	12,200
24		445	325	325	445	3,710	83,550	4,580	7,970	9,250	16,700	12,200
25		555	325	325	845	4,120	33,550	4,580	6,200	8,380	407,500	11,150
26		445	325	325	1,240	3,710	9,250	10,650	5,605	7,970	88,500	11,150
27		410	325	325	900	2,235	6,200	8,800	5,085	7,200	26,450	10,150
28	690		325	280	515	1,405	4,580	10,650	5,085	6,200	18,950	10,150
29	965		325	280	790	1,320	3,330	8,380	4,825	6,200	17,450	9,250
30	565		300	380			2,235	13,350				
31	445		300	380	740							
		555	380		18,950	10,150	286,500	19,750	40,900	20,600	407,500	17,450
	965	325	300	280	280	300	1,320	1,780	4,825	5,085	6,200	9,250
	664	375	337	322	1,301	2,467	87,591	6,836	14,409	11,011	39,525	12,977
Maximum												
Minimum												
Mean												

NOTE.—Record from November 10, 1921, to May 11, 1922, fair below 8,230 second-liters.

Daily and monthly discharges, in liters per second, of Tipituan River near Sermon, Sibulom, Antique, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.	2,720	825	520	520	1,370	52,050	159,500	37,350	13,300	44,150	26,650	1,290
2.	2,595	825	520	450	2,115	61,050	173,100	56,300	10,750	56,300	31,600	1,053
3.	2,470	670	520	450	2,595	61,050	447,000	31,600	78,100	93,700	9,700	1,053
4.	2,470	670	520	380	2,720	172,000	672,000	14,750	111,900	111,900	11,950	1,023
5.	2,230	670	520	380	2,985	71,700	259,500	10,750	24,300	85,400	10,750	1,023
6.	2,230	670	380	380	2,115	31,600	56,300	9,700	7,050	44,150	10,750	904
7.	2,230	595	380	380	2,230	29,050	147,000	71,700	26,650	22,100	66,100	904
8.	2,000	520	450	380	3,125	22,100	347,000	122,000	16,300	14,750	122,000	904
9.	2,000	520	380	380	3,875	18,100	147,000	259,500	18,100	31,600	24,300	846
10.	1,780	520	380	315	3,265	51,050	184,500	447,000	184,500	29,050	7,800	792
11.	1,780	520	380	315	2,230	31,600	159,500	159,500	147,000	44,150	7,800	792
12.	1,675	520	380	255	5,750	48,000	159,500	159,500	56,300	71,700	8,700	732
13.	1,570	825	380	255	8,700	85,400	134,500	78,100	44,150	44,150	5,250	686
14.	1,470	995	380	255	11,950	48,000	93,700	134,500	52,050	297,000	259,500	686
15.	1,470	825	380	200	22,100	472,000	44,150	222,000	52,050	322,000	134,500	686
16.	1,570	825	380	200	37,350	122,000	78,100	222,000	722,000	61,050	34,400	588
17.	1,570	670	380	200	111,900	48,000	93,700	347,000	422,000	37,350	44,150	588
18.	1,470	670	380	200	25,650	31,600	56,300	222,000	697,050	22,100	66,100	545
19.	1,780	670	380	745	52,050	122,000	44,150	172,000	472,000	40,650	2,682	588
20.	1,570	670	380	520	44,150	61,050	61,050	40,650	111,900	71,700	2,182	588
21.	1,370	825	380	380	1,822,000	85,400	122,000	34,400	52,050	102,100	1,865	545
22.	1,370	670	380	670	1,634,500	85,400	61,050	22,100	52,050	78,100	1,774	636
23.	1,275	670	315	1,780	2,000	750	85,400	14,750	61,050	52,050	1,586	503
24.	1,180	595	315	2,000	200	322,000	197,000	9,700	34,400	56,300	1,440	503
25.	995	595	315	1,780	34,400	322,000	297,000	7,800	24,300	40,650	1,290	1,083
26.	825	595	255	825	71,700	147,000	359,500	16,300	61,050	44,150	1,364	1,053
27.	995	595	380	995	71,700	222,000	194,500	85,400	107,000	52,050	1,290	2,430
28.	745	595	380	1,370	37,350	134,500	197,000	26,650	142,100	71,700	1,053	1,219
29.	745	.....	825	1,150	52,050	89,700	71,700	9,700	71,700	147,000	3,312	1,290
30.	670	.....	670	1,370	159,500	372,000	56,300	14,750	44,150	37,350	3,312	1,290
31.	595	.....	595	.....	44,150	.....	56,300	13,300	44,150	11,950	1,440	1,053
Maximum.....	2,720	995	1,370	2,000	1,822,000	472,000	1,634,500	347,000	722,000	322,000	259,500	2,430
Minimum.....	595	520	255	200	1,370	18,100	44,150	7,800	10,750	11,950	1,440	503
Mean.....	1,594	672	457	650	117,706	117,293	197,982	90,563	139,325	70,565	30,113	898

NOTE.—See also footnote to discharge table for 1921. Record from May 12 to November 18, 1922, fair below 132,500 second-liters; also from November 19 to December 31, 1922 below 2,600 second-liters.

## BATAAN PROVINCE

### CABAYO CANAL, LIMAY

**LOCATION.**—About 300 m. above the Lamao River gaging station and within the territory of the Agricultural Experiment Station.

**RECORDS AVAILABLE.**—From May 15, 1922, to December 31, 1922.

**GAGE.**—Standard metric gage board vertically set on the right bank of the canal.

**DISCHARGE MEASUREMENTS.**—Made by wading.

**CHANNEL AND BANKS.**—One channel at all stages; straight for 20 m. above and below the station. Bed of the canal sandy and gravelly. Both banks low and lined with gravel.

**EXTREMES OF DISCHARGE.**—Maximum discharge recorded during period of observation, 120 second-liters on August 27, 1922; minimum discharge, 16 second-liters on October 23, 1922.

**DIVERSIONS.**—This canal is a diversion of the Lamao River.

**REGULATION.**—Only by diversion.

**ACCURACY.**—Gage read twice daily. Rating curve well-defined. Records good for all stages.

#### *Discharge measurements of Cabayo Irrigation Canal, near Lamao, Limay, Bataan*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1922</b>				
March 5. . . . .	Julian Roxas. . .	62	38	.....
May 15. . . . .	.. do. . . . .	60	44	.....
June 26. . . . .	.. do. . . . .	57	31	.....
July 24 . . . . .	.. do. . . . .	78	60	.....
November 13. . . .	P. del Castillo . .	75	84	.....

Daily and monthly discharges, in liters per second, of Cabuyo Irrigation Canal, Lamao, Limay, Bataan, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.						29	33	114	38	40	18	80
2.						29	31	105	38	38	18	80
3.						29	33	100	38	38	19	80
4.						29	31	114	38	38	27	80
5.						33	33	114	38	31	25	76
6.						38	46	110	38	25	25	76
7.						38	38	105	38	25	23	76
8.						42	33	100	38	21	23	84
9.						42	33	114	38	21	23	84
10.						48	29	114	38	19	38	80
11.						33	40	114	38	19	35	72
12.						29	35	110	38	18	35	70
13.						27	38	105	38	18	35	66
14.						31	29	105	38	19	84	66
15.						33	33	96	40	19	84	66
16.						27	66	105	48	18	84	70
17.						29	80	110	52	19	88	66
18.						29	80	110	48	19	88	66
19.						31	80	96	42	18	84	66
20.						35	80	96	42	18	84	66
21.						33	72	100	32	18	84	70
22.						35	72	100	40	18	84	64
23.						35	80	96	38	16	80	66
24.						33	88	88	38	18	80	66
25.						33	96	96	38	18	80	66
26.						42	96	96	40	18	84	66
27.						29	105	120	38	21	88	66
28.						42	100	100	48	33	84	66
29.						25	100	76	54	33	80	64
30.						32	100	48	48	29	80	52
31.						29	105	40	48	29	80	58
Maximum.					53	48	105	120	54	40	88	84
Minimum.					31	25	29	40	38	16	18	52
Mean.					44	33	62	100	41	24	60	73

NOTE.—Discharge determined from well-defined rating curve.

## BATAAN PROVINCE

## CALAGUIMAN RIVER, SAMAL

LOCATION.—About 1,225 m. S. 77° 30' W. of Roman Catholic Chapel at Barrio Calaguiman.

RECORDS AVAILABLE.—From December 3, 1917, to May 31, 1919.

GAGE.—Standard metric gage board vertically fastened against a "bane" tree on left bank of river.

DISCHARGE MEASUREMENTS.—Made by wading at section 82.25 m. below gage.

CHANNEL AND BANKS.—Straight about 200 m. above and 550 m. below the gaging section. Banks planted to sugar cane. Stream bed sandy and gravelly. Only one channel at low and high water stage.

EXTREMES OF DISCHARGE.—Maximum discharge during period of observation, 20,860 second-liters on July 10, 1918; minimum discharge, 79 second-liters in June, 1918, and February and May, 1919.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For water right purposes.

ACCURACY.—Daily discharge determined from a fairly well-defined curve from 50 to 1,900 second-liters. Above the higher value the discharges are estimated from extension of rating curve. Applicable from December 3, 1917, to May 31, 1919. Gage read twice daily.

*Discharge measurements of Calaguiman River, near Calaguiman, Samal, Bataan*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1917</b>				
October 5	P. J.		560	
October 12	do.		680	
October 19	do.		540	
October 27	do.		890	
November 3	do.		320	
November 10	do.		250	
November 17	do.		170	
November 26	do.		1,950	
December 1	do.		1,580	
December 8	do.		400	
December 15	do.		340	
December 22	do.		200	
December 29	do.		320	
<b>1918</b>				
January 5	D. B. and F. M.		330	
January 12	do.		185	
January 19	do.		100	
January 26	do.		80	
February 2	do.		97	
February 9	do.		148	
February 16	do.		144	
February 23	do.		130	
March 6	do.		60	
March 9	D. B. and P. S.		54	
March 16	do.		91	
March 23	do.		120	
March 30	do.		150	
April 9	do.		50	
April 13	do.		50	
April 23	do.		30	
May 14	do.		50	
May 21	do.		102	
May 28	do.		336	
June 4	do.		54	
June 15	do.		146	
June 22	do.		102	

*Discharge measurements of Calaguiman River, near Calaguiman, Samal,  
Bataan—Continued*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1918</b>				
July 6 ..	P. J. T.	32	1,181	
July 20 ..	do ..	49	1,933	
August 10. ....	do. ....	16	86	
August 17 .....	do. ....	46	1,021	
August 24. ....	do. ....	36	877	
September 7.....	do. ....	76	4,697	
September 14.....	do. ....	54	2,257	
September 21.....	do. ....	36	992	
September 28.....	do. ....	32	606	
October 5. ....	do. ....	44	1,529	
October 12. ....	do. ....	58	2,577	
October 19. ....	do. ....	76	5,130	
October 26. ....	do. ....	46	1,448	
November 2. ....	do. ....	34	995	
November 9. ....	do. ....	32	702	
November 16. ....	do. ....	26	339	
November 23. ....	do. ....	24	200	
November 30. ....	do. ....	24	171	
December 7. ....	do. ....	26	228	
December 14. ....	do. ....	26	337	
December 21. ....	do. ....	26	337	
December 27. ....	do. ....	26	386	
<b>1921</b>				
February 19. ....	I. Villo .....		14	

*Discharge measurements of Calaguiman River, near Mabatan, Abucay,  
Bataan*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1921</b>				
February 19 ..	I. Villo	...	303	.. . .

*Discharge measurements of Calaguiman River, near Santa Lucia, Samal,  
Bataan*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1921</b>				
February 19. . . .	I. Villo ..	.	9,000	.....

Daily and monthly discharges, in liters per second, of Calaguiman River near Calaguiman, Sanal, Bataan, for the year 1917

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.												
2.												
3.												550
4.												755
5.												1,055
6.												2,015
7.												1,925
8.												3,075
9.												3,075
10.												3,430
11.												2,745
12.												2,115
13.												2,115
14.												1,555
15.												1,258
16.												1,135
17.												1,135
18.												550
19.												615
20.												650
21.												650
22.												755
23.												1,825
24.												2,635
25.												4,170
26.												3,975
27.												3,075
28.												2,545
29.												2,735
30.												1,735
31.												1,480
Maximum.												4,175
Minimum												480
Mean												1,763

NOTE.—No records of gage heights for dates in which discharges are not given.



Daily and monthly discharges, in liters per second, of Calaguiman River near Calaguiman, Samar, Bataan, for the year 1918

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	328	120	142	170	142	205	8,060	2,115	8,060	426	376	170
2.....	426	120	142	170	142	205	1,703	1,826	5,700	426	376	170
3.....	615	120	120	170	142	205	1,135	1,055	4,570	376	685	142
4.....	1,215	120	120	170	120	170	975	825	4,170	328	615	120
5.....	1,600	120	120	188	120	240	825	615	14,300	900	550	170
6.....	2,215	120	120	223	120	305	550	401	10,780	975	550	240
7.....	2,590	120	98	223	120	352	685	352	5,550	550	550	240
8.....	2,590	120	98	223	120	305	1,135	240	2,715	426	550	240
9.....	2,800	120	170	170	120	305	10,110	240	2,715	376	550	240
10.....	2,745	120	109	170	156	328	20,860	281	2,215	426	550	240
11.....	2,420	120	900	170	156	142	12,220	4,235	2,855	2,525	488	240
12.....	1,512	120	550	170	120	142	11,150	5,120	4,300	1,645	426	205
13.....	1,720	120	240	156	156	79	7,740	6,005	3,190	1,215	376	240
14.....	888	120	170	205	170	79	8,220	3,910	2,685	1,055	328	240
15.....	15	131	170	205	170	120	7,900	2,450	2,115	4,840	240	205
16.....	170	156	170	205	170	98	9,500	1,825	2,115	7,000	240	205
17.....	282	170	142	223	170	120	3,795	1,352	1,825	7,000	205	240
18.....	550	170	142	240	170	170	2,800	1,055	1,215	5,405	170	240
19.....	120	170	142	240	170	142	1,968	1,755	1,055	4,170	170	240
20.....	120	156	131	205	170	170	1,513	3,075	825	2,965	170	240
21.....	120	142	120	188	170	170	3,910	1,825	825	2,215	170	240
22.....	120	142	120	170	170	170	9,820	1,135	825	7,100	170	170
23.....	120	142	120	142	170	170	6,160	900	755	3,540	170	170
24.....	120	142	142	142	170	156	5,775	615	685	2,525	170	170
25.....	120	142	142	142	170	142	4,705	5,850	755	1,735	170	170
26.....	120	142	142	120	240	142	2,705	1,352	1,825	2,525	170	282
27.....	120	142	170	223	305	120	6,780	1,352	550	2,315	170	240
28.....	120	142	170	170	240	14,304	4,368	1,352	550	1,055	170	240
29.....	120	.....	.....	.....	205	6,238	4,705	9,340	550	.....	.....	.....
30.....	120	.....	.....	.....	205	.....	3,075	5,340	.....	488	.....	.....
31.....	120	.....	.....	.....	205	.....	.....	.....	.....	.....	.....	.....
Maximum.....	2,800	170	900	240	376	14,304	20,860	9,340	14,300	7,100	755	328
Minimum.....	120	120	98	120	120	79	550	2,396	550	328	170	120
Mean.....	814	135	180	183	168	853	843	2,396	392	2,127	350	217

Note.—No records of gage heights for dates in which discharges are not given.

Daily and monthly discharges, in liters per second, of Calaguiman River near Calaguiman, Samal, Bataan, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	170	120	120		426							
2	205	120	120		426							
3	170	120	120		426							
4	170	120	120		426							
5	170	120	120		426							
6	170	120	98		426							
7	170	98	98		426							
8	170	205	98		426							
9	170	120			426							
10	170	98			426							
11	142	79			426							
12	98	79			426							
13	60	79		488	426							
14	170	120		426	556							
15	170	170		426	426							
16	170	170		550	426							
17	170	98		488	426							
18	142	79		488	79							
19	142	120		426	79							
20	98	142		488	79							
21	120	142		488	79							
22	170	170		426	79							
23	240	170		426	79							
24	240	120		426	79							
25	240	120		488	79							
26	142	120		426	79							
27	120	120		426	79							
28	120	120		426	79							
29	120	120		426	98							
30	120	120		426	98							
31	120	120		426	79							
Maximum.	240	205	120	550	550							
Minimum.	60	79	98	426	79							
Mean.	152	123	111	453	274							

NOTE.—No records of gage heights for dates in which discharges are not given.

## BATAAN PROVINCE

## LAMAQ RIVER, LIMAY

LOCATION.—About 400 m. inland from Lamao Experiment Station, and is opposite No. 39 "Hevi" Tree which is at the left side of the lane as one walks towards the experimental station.

RECORDS AVAILABLE.—From October 5, 1919, to December 31, 1922, with break from July 1, 1921 to December 31, 1921.

GAGE.—A four-meter gage board graduated in centimeters, fastened vertically to the big roots of Sahing (Gutta Percha) tree at right bank of stream.

DISCHARGE MEASUREMENTS.—Made by wading at section of gage.

CHANNEL AND BANKS.—Channel only one at all stages; straight for 50 m. above and for 70 m. below the station. Banks thickly wooded; right bank high and steep, left bank low subject to overflow, and sloping. Stream bed full of boulders, hence accuracy of measurements greatly affected.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 18,344 second-liters on July 18, 1920; minimum discharge, 100 second-liters from April 20 to May 2, 1920.

DIVERSIONS.—One below station.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge determined from a poorly defined curve. Table arbitrarily extended back for 1919 as no appreciable change of bed has been noted.

Gage read twice daily.

*Discharge measurements of Lamao River, near Lamao, Limay, Bataan*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1920</b>				
February 5	J. San Jose	.70	413	
February 25	do.	.69	456	
March 8	do.	.67	413	
March 29	do.	.66	403	
April 19	do.	.63	313	
May 6	do.	.64	301	
May 21	do.	.67	412	
June 2	A. Fegarido	.66	257	
August 4	do.	.63	310	
September 14	J. S. Roxas	.93	2,179	
October 21	do.	.84	1,049	
<b>1921</b>				
February 12	R. and C. Castillo	.67	384	
March 14	do.	.65	290	
April 14	do.	.62	226	
May 24	do.	.70	233	
June 9	do.	.82	753	
September 26	do.	.69	1,658	
September 27	do.	1.12	2,811	
<b>1922</b>				
March 31	Julian Roxas	.76	228	
May 15	do.	.76	230	
June 26	do.	.79	340	
July 24	do.	1.04	1,622	
July 24	do.	1.04	3,143	
November 13	Protacio del Castillo	.86	883	

*Daily and monthly discharges, in liters per second, of Lamao River near Lamao Horticultural Station, Lima, Bataan, for the year 1919*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1											1,254	911
2											1,166	866
3											1,066	911
4											911	911
5										1,728	911	911
6										2,800	911	911
7										1,728	911	911
8										1,562	911	911
9										1,562	911	911
10										2,254	911	911
11										2,562	911	911
12										2,562	1,482	911
13										2,562	1,482	911
14										1,728	1,156	911
15										1,728	911	911
16										2,254	911	911
17										2,728	911	911
18										1,966	986	911
19										1,728	1,254	911
20										1,728	1,156	714
21										1,364	1,066	655
22										1,254	1,066	655
23										1,482	911	776
24										1,482	1,066	776
25										1,482	911	776
26										1,482	1,066	776
27										1,254	911	776
28										1,254	911	776
29										1,482	911	655
30										1,254	1,066	714
31										1,254	1,364	655
Maximum.										2,800	1,482	1,066
Minimum.										911	911	655
Mean.										1,710	1,042	837

*Daily and monthly discharges, in liters per second, of Lamao River near Lamao Horticultural Station, Limay, Bataan,  
for the year 1920*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	655	400	234	198	100	162	4,140	4,006	2,866	1,728	841	714
2.....	600	448	234	198	100	198	1,728	3,604	2,866	1,728	841	714
3.....	600	448	234	198	129	448	1,728	3,604	2,866	1,728	841	714
4.....	546	357	234	198	129	911	1,728	2,866	2,866	1,728	841	714
5.....	546	357	234	198	129	1,066	911	2,866	2,866	1,728	841	714
6.....	546	448	234	198	129	1,066	911	2,866	2,866	1,728	841	714
7.....	546	448	234	198	129	1,066	911	2,866	2,866	1,728	841	714
8.....	546	448	234	198	129	1,066	911	2,866	2,866	1,728	841	714
9.....	546	448	234	198	129	1,066	911	2,866	2,866	1,728	841	714
10.....	546	448	234	198	129	1,066	911	2,866	2,866	1,728	841	714
11.....	496	448	234	198	234	448	448	1,728	3,470	1,728	776	714
12.....	496	448	234	198	234	357	448	1,728	3,470	1,728	776	714
13.....	496	448	234	198	234	357	448	1,728	3,470	1,728	776	714
14.....	496	448	234	198	234	357	448	1,728	3,470	1,728	776	714
15.....	496	448	234	198	234	357	448	1,728	3,470	1,728	776	714
16.....	496	448	234	198	234	357	448	1,728	3,470	1,728	776	714
17.....	496	448	234	198	234	357	448	1,728	3,470	1,728	776	714
18.....	496	448	234	198	234	357	448	1,728	3,470	1,728	776	714
19.....	496	448	234	198	234	357	448	1,728	3,470	1,728	776	714
20.....	496	448	234	198	234	357	448	1,728	3,470	1,728	776	714
21.....	496	448	234	198	234	357	448	1,728	3,470	1,728	776	714
22.....	496	448	234	198	234	357	448	1,728	3,470	1,728	776	714
23.....	496	448	234	198	234	357	448	1,728	3,470	1,728	776	714
24.....	496	448	234	198	234	357	448	1,728	3,470	1,728	776	714
25.....	496	448	234	198	234	357	448	1,728	3,470	1,728	776	714
26.....	496	448	234	198	234	357	448	1,728	3,470	1,728	776	714
27.....	496	448	234	198	234	357	448	1,728	3,470	1,728	776	714
28.....	496	448	234	198	234	357	448	1,728	3,470	1,728	776	714
29.....	496	448	234	198	234	357	448	1,728	3,470	1,728	776	714
30.....	496	448	234	198	234	357	448	1,728	3,470	1,728	776	714
31.....	496	448	234	198	234	357	448	1,728	3,470	1,728	776	714
Maximum.....	655	448	274	198	1,254	5,078	18,344	4,006	7,088	1,728	841	714
Minimum.....	448	448	162	100	100	162	448	1,066	1,482	1,482	274	546
Mean.....	504	396	218	143	309	783	4,586	1,876	3,391	1,822	562	659

*Daily and monthly discharges, in liters per second, of Lamao River near Lamao Horticultural Station, Limay, Bataan, for the year 1921*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	501	390	316	340	222	233	2,010	397	1,578	1,718	912	1,185
2.....	501	365	316	340	222	194	753	397	1,130	1,718	912	1,126
3.....	501	365	292	316	222	233	1,074	397	397	1,648	858	1,014
4.....	473	365	292	268	222	233	2,811	614	660	1,578	858	1,014
5.....	445	365	292	244	222	233	..	966	568	1,648	858	906
6.....	445	365	292	244	222	233	..	3,733	397	2,010	858	906
7.....	417	365	292	244	222	273	..	2,478	355	1,578	858	853
8.....	417	365	292	244	222	397	..	1,578	314	1,442	804	853
9.....	390	340	292	244	222	660	1,074	1,377	273	1,718	1,578	800
10.....	390	340	292	244	222	397	233	1,578	233	1,510	2,377	790
11.....	390	340	292	244	222	314	481	2,160	233	1,510	2,058	790
12.....	365	340	292	244	365	314	314	4,395	568	1,442	2,058	750
13.....	365	340	292	244	365	233	753	3,533	118	1,578	2,244	750
14.....	365	340	292	244	365	397	912	6,637	1,442	1,442	3,508	750
15.....	365	316	292	244	365	417	753	858	858	1,372	2,378	750
16.....	340	316	292	244	365	481	804	8,643	397	1,312	1,507	700
17.....	390	316	292	244	365	439	439	4,631	314	1,188	1,557	700
18.....	417	316	292	244	706	397	753	3,837	533	1,188	1,306	700
19.....	417	316	292	244	660	273	439	2,883	533	1,188	1,245	700
20.....	417	316	292	222	397	524	439	4,567	397	1,130	1,245	700
21.....	390	316	292	222	397	397	524	4,985	753	1,074	1,431	700
22.....	390	316	292	222	660	355	1,086	7,108	706	1,074	1,368	650
23.....	390	316	292	222	341	273	2,086	6,283	397	1,074	1,557	650
24.....	390	316	316	222	439	481	2,630	3,249	314	1,074	2,378	603
25.....	390	316	340	222	222	614	2,630	4,299	233	966	2,378	603
26.....	390	316	340	222	481	1,578	1,935	3,249	2,725	912	1,832	603
27.....	390	316	340	222	273	660	1,312	1,935	2,160	912	1,622	603
28.....	390	316	340	222	273	1,118	853	1,510	1,935	912	1,431	603
29.....	390	..	340	222	273	1,510	681	1,312	1,935	912	1,431	603
30.....	390	..	340	222	233	1,510	439	1,442	1,790	912	1,245	603
31.....	390	..	340	..	233	..	439	1,578	..	912	..	603
Maximum.....	501	390	340	340	706	1,578	2,811	8,643	2,725	2,010	3,506	1,185
Minimum.....	340	316	292	222	222	118	156	3,063	118	912	804	603
Mean.....	409	337	306	245	327	494	983	..	748	1,331	1,580	769

Note.—Discharge determined from fairly well-defined rating curve applicable from May 18 to November 10, 1921. Record fair below 4,600 second-liters.

*Daily and monthly discharges, in liters per second, of Lamao River near Lamao Horticultural Station, Limay, Bataan, for the year 1922*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	603	431	288	230	258	230	288	10,587	1,014	2,134	750	511
2	603	431	288	230	230	230	288	9,132	1,014	1,907	750	511
3	556	431	288	230	320	230	320	8,647	1,014	1,760	700	511
4	556	431	288	230	258	258	258	4,185	1,014	1,690	700	511
5	556	431	288	230	230	258	258	3,172	1,014	1,760	700	511
6	556	393	288	230	207	258	258	2,126	1,014	1,760	700	511
7	556	393	288	230	207	258	258	2,126	1,014	1,760	700	511
8	556	352	288	230	207	800	2,547	1,306	1,014	1,494	650	511
9	556	352	288	230	207	800	2,547	1,306	1,014	1,494	650	511
10	511	355	288	207	184	1,907	2,622	1,245	959	1,557	700	511
11	511	355	288	207	184	1,494	9,908	1,126	959	1,557	700	511
12	511	355	258	207	184	800	2,730	1,069	1,014	1,306	650	556
13	511	320	288	207	184	800	1,760	1,014	1,494	1,245	603	556
14	511	320	288	207	230	700	1,445	906	1,622	1,245	603	556
15	511	320	230	207	258	603	1,014	1,014	1,306	1,245	603	556
16	511	320	230	207	230	511	1,014	1,126	2,924	1,306	603	556
17	511	320	230	207	230	393	853	1,126	3,312	1,368	603	556
18	511	320	230	207	288	320	1,136	3,700	9,229	1,306	556	556
19	511	320	230	207	288	320	906	1,622	9,617	1,245	556	556
20	470	320	230	207	288	320	800	1,126	3,700	1,245	556	556
21	470	320	230	207	230	288	603	1,014	3,312	1,245	511	556
22	470	320	230	207	230	288	603	1,014	3,312	1,245	511	556
23	470	320	230	207	230	288	800	1,014	2,730	1,245	511	556
24	470	320	258	603	603	258	1,622	1,368	2,112	1,126	511	556
25	470	320	556	556	511	288	3,700	1,245	2,058	906	511	556
26	470	320	556	556	511	288	6,610	1,245	2,058	853	470	556
27	470	320	556	556	511	288	6,901	1,245	1,760	853	470	556
28	470	320	556	556	511	288	4,670	1,126	2,058	853	511	556
29	511	320	556	556	288	320	2,037	1,069	3,312	800	556	556
30	470	320	556	556	288	320	7,774	1,069	2,378	800	511	556
31	431	320	288	288	230	320	10,684	1,014	9,617	750	556	556
Maximum	603	431	288	603	906	2,378	10,684	10,587	9,617	2,134	750	650
Minimum	431	320	230	207	184	230	238	906	959	1,317	470	511
Mean	511	354	262	297	296	543	2,618	2,259	2,384	1,317	603	582

NOTE.—Discharge determined from fairly well-defined rating curve applicable from November 11, 1921, to December 31, 1921. Records fair below 8,400 second-liters.

## BATAAN PROVINCE

## ORANI RIVER, ORANI

LOCATION.—About 120 m. west of the Hacienda Tionson, which is about 800 m. southwest of the municipality of Orani on a private road branching near Km. 13 of the Samal-Orani Road.

RECORDS AVAILABLE.—From August 10, 1920, to December 31, 1922. Also from December 12, 1917, to May 31, 1919, at about the same place as the present station.

GAGE.—Standard metric gage board vertically driven into hard clay near the right bank and made rigid by means of two supports.

DISCHARGE MEASUREMENTS.—Made by wading at section of gage.

CHANNEL AND BANKS.—Channel only one at all stages; straight for about 50 m. above and 80 m. below the station.

Right bank low, sloping, subject to overflow and grassy; left bank high and wooded. Stream bed stony.

EXTREMES OF DISCHARGE.—Maximum discharge during period of observation 12,710 second-liters on September 18, 1922; minimum discharge 10 second-liters on February 28 to March 1, 3, 4, and 6, 1919.

DIVERSIONS.—Many diversion canals above station.

REGULATION.—None.

UTILIZATION.—For adjudication of water rights.

ACCURACY.—Gage-heights not very reliable as the station is influenced largely by tides and diversion canals. Gage read twice daily.

*Discharge measurements of Orani River, near Isaac Tongco, Orani, Bataan*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1916</b>				
November 2..	G. C. . . . .		262	
November 9 .	do . . . . .		80	
November 16 .	do . . . . .		200	
November 20 .	do . . . . .		250	
December 7..	do . . . . .		250	
<b>1917</b>				
January 11 .	P. J. . . . .		210	
January 18..	do . . . . .		190	
January 25..	do . . . . .		160	
February 1 .	do . . . . .		100	
February 8 .	do . . . . .		240	
February 15..	do . . . . .		140	
February 21..	do . . . . .		170	
March 1 . . . . .	do . . . . .		190	
March 8 . . . . .	do . . . . .		90	
March 15..	do . . . . .		90	
March 22..	do . . . . .		30	
March 29 . . . . .	do . . . . .		60	
April 4 . . . . .	do . . . . .		60	
April 12..	do . . . . .		80	
April 19 . . . . .	do . . . . .		140	
April 25 . . . . .	do . . . . .		570	
May 3 . . . . .	do . . . . .		670	
May 10 . . . . .	do . . . . .		350	
May 17..	do . . . . .		190	
May 21..	do . . . . .		60	
May 24..	do . . . . .		220	
May 31..	do . . . . .		170	
June 7 . . . . .	do . . . . .		70	
June 14..	do . . . . .		80	
June 28 . . . . .	do . . . . .		1,100	
July 5 . . . . .	do . . . . .		600	
July 12 . . . . .	do . . . . .		1,940	



*Discharge measurements of Orani River, near Isaac Tongco, Orani,  
Bataan—Continued*

Date	Made by—	Gage height (meters)	Discharge (second- liters)	Remarks
<b>1917</b>				
July 20. . . . .	P. J. . . . .		5,140	
July 27. . . . .	do. . . . .		650	
October 6. . . . .	do. . . . .		457	
October 13. . . . .	do. . . . .		560	
October 20. . . . .	do. . . . .		314	
October 26. . . . .	do. . . . .		619	
November 2. . . . .	do. . . . .	25	305	
November 9. . . . .	do. . . . .	31	215	
November 16. . . . .	do. . . . .	43	140	
November 23. . . . .	do. . . . .	29	260	
November 30. . . . .	do. . . . .	08	1,015	
December 7. . . . .	do. . . . .	20	525	
December 14. . . . .	do. . . . .	24	360	
December 21. . . . .	do. . . . .	22	490	
December 28. . . . .	D. B. . . . .	28	350	
<b>1918</b>				
January 4. . . . .	do. . . . .	30	190	
January 29. . . . .	do. . . . .	29	200	
January 18. . . . .	do. . . . .	33	70	
January 25. . . . .	do. . . . .	32	80	
February 1. . . . .	do. . . . .	32	72	
February 8. . . . .	do. . . . .	32	88	
February 15. . . . .	do. . . . .	24	70	
February 22. . . . .	do. . . . .	22	48	
March 1. . . . .	do. . . . .	22	54	
March 8. . . . .	do. . . . .	23	98	
March 15. . . . .	do. . . . .	26	112	
March 26. . . . .	do. . . . .	23	60	
April 3. . . . .	do. . . . .	25	60	
April 5. . . . .	do. . . . .	25	48	
April 19. . . . .	do. . . . .	21	35	
April 26. . . . .	do. . . . .	20	37	
May 10. . . . .	do. . . . .	23	734	
May 17. . . . .	do. . . . .	23	50	
May 24. . . . .	do. . . . .	23	30	
May 31. . . . .	do. . . . .	19	62	
June 7. . . . .	do. . . . .	28	82	
June 14. . . . .	do. . . . .	20	24	
June 21. . . . .	do. . . . .	40	40	
June 28. . . . .	do. . . . .	43	35	
July 5. . . . .	do. . . . .	35	556	
July 19. . . . .	do. . . . .	66	3,120	
August 7. . . . .	P. P. and T. C. . . . .	46	556	
August 16. . . . .	do. . . . .	29	2,015	
August 23. . . . .	do. . . . .	38	803	
August 30. . . . .	do. . . . .	73	2,966	
August 31. . . . .	do. . . . .	23	378	
September 6. . . . .	do. . . . .	95	7,579	
September 7. . . . .	do. . . . .	17	594	
September 13. . . . .	do. . . . .	59	2,714	
September 14. . . . .	do. . . . .	20	468	
September 20. . . . .	do. . . . .	37	980	
September 21. . . . .	do. . . . .	28	234	
September 27. . . . .	do. . . . .	37	775	
September 28. . . . .	do. . . . .	24	990	
October 4. . . . .	do. . . . .	48	418	
October 11. . . . .	do. . . . .	22	363	
October 18. . . . .	do. . . . .	72	3,807	
October 25. . . . .	do. . . . .	28	1,617	
November 1. . . . .	do. . . . .	42	789	
November 8. . . . .	do. . . . .	52	498	
November 15. . . . .	do. . . . .	32	520	
November 22. . . . .	do. . . . .	60	173	
November 29. . . . .	do. . . . .	55	172	
December 6. . . . .	do. . . . .	53	250	
December 13. . . . .	do. . . . .	56	122	
December 21. . . . .	do. . . . .	52	282	
December 27. . . . .	do. . . . .	52	385	
<b>1920</b>				
June 25. . . . .	A. Fegarido. . . . .		45	
August 9. . . . .	do. . . . .	1.14	413	
August 10. . . . .	do. . . . .	1.20	475	
August 11. . . . .	do. . . . .	1.23	499	
October 20. . . . .	J. Roxas. . . . .	1.31	327	

*Discharge measurements of Orani River, near Isaac Tongco, Orani,  
Bataan—Continued*

Date	Made by—	Gage height (meters)	Discharge (second- liters)	Remarks
<b>1921</b>				
February 7.....	R. and C.....	1 21	177	.....
February 8.....	do.....	1.20	176	.....
March 15.....	Castillo.....	1 12	63	.....
April 13.....	do.....	1 10	36	.....
May 23.....	do.....	1 20	43	.....
June 11.....	do.....	.62	18	.....
July 28.....	Roxas.....	.80	888	.....
September 27.....	do.....	.67	584	.....
December 29.....	do.....	.65	199	.....
<b>1922</b>				
March 30.....	do.....	.58	87	.....
April 1.....	do.....	.58	84	.....
June 25.....	do.....	.73	727	.....
July 21.....	do.....	.36	1,124	.....
July 22.....	do.....	.38	1,263	.....
August 21.....	do.....	.38	1,721	.....
November 5.....	Castillo.....	.19	409	.....
December 12.....	do.....	.20	502	.....

NOTE.—Gage heights from August 9, 1920, referred to different data.



Daily and monthly discharges, in liters per second, of Orani River near Isaac Tongco, Orani, Bataan, for the year 1918

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.	210	108	234	284	234	166	...	1,199	8,187	470	542	146
2.	234	186	234	312	234	166	...	1,844	2,677	370	470	146
3.	234	622	234	312	234	166	...	750	2,273	400	435	146
4.	706	1,306	234	312	234	166	...	542	2,471	435	370	108
5.	622	1,769	234	312	234	166	1,093	542	6,071	506	284	186
6.	1,648	2,017	234	312	258	340	942	258	4,589	470	234	186
7.	1,306	1,708	234	312	258	435	893	166	3,187	435	234	146
8.	1,474	1,360	234	312	258	370	7,319	108	2,819	400	234	146
9.	1,306	1,797	234	312	258	370	10,049	146	2,954	340	186	146
10.	1,306	400	234	312	258	340	2,017	146	1,830	258	186	146
11.	1,093	78	435	312	258	258	4,511	370	1,830	258	186	186
12.	706	14	400	312	258	284	3,111	4,511	3,187	844	186	146
13.	340	340	370	312	284	312	5,369	7,631	1,954	750	146	108
14.	166	312	340	284	312	210	5,135	3,887	2,080	622	146	108
15.	78	284	284	284	284	186	4,745	2,273	2,607	506	234	284
16.	52	284	284	258	284	258	3,419	1,648	1,708	186	186	284
17.	146	284	312	258	258	258	2,891	1,360	1,360	11,531	186	186
18.	542	340	284	234	258	312	2,273	1,582	1,252	17,553	146	186
19.	1,306	284	284	210	258	234	2,273	542	797	2,677	146	186
20.	1,708	284	284	210	284	234	1,954	1,708	706	1,880	146	186
21.	1,531	258	284	210	258	234	2,963	1,708	706	1,880	108	186
22.	1,531	294	258	210	284	234	3,341	1,040	706	1,360	108	186
23.	1,417	294	258	210	258	234	3,809	797	435	4,043	108	186
24.	662	258	258	186	258	234	3,653	893	582	1,954	108	146
25.	26	294	258	186	258	186	3,887	706	582	1,360	108	146
26.	186	294	258	186	258	258	2,963	1,417	844	1,040	108	108
27.	284	294	258	186	210	210	2,273	1,417	706	1,040	108	108
28.	78	284	234	312	186	234	4,745	942	582	706	78	146
29.	284	284	234	234	186	234	3,419	844	582	706	78	108
30.	42	...	234	234	186	750	3,341	844	435	622	78	108
31.	64	...	284	...	166	...	2,071	2,891	...	...	...	108
Maximum....	1,708	2,017	435	312	312	750	10,049	7,631	6,071	11,531	542	284
Minimum....	42	14	14	186	166	166	893	108	435	258	78	108
Mean....	714	524	275	264	258	274	3,451	1,431	1,830	1,567	195	160

Daily and monthly discharges, in liters per second, of Orani River near Isaac Tongco, Orani, Bataan, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.	108	108	10		33							
2.	108	108	16		33							
3.	108	108	10		33							
4.	78	108	10		33							
5.	78	108	18		33							
6.	78	52	10		33							
7.	78	52	33		33							
8.	78	52	33		33							
9.	78	52			33							
10.	78	52			33							
11.	78	78			33							
12.	78	78			33							
13.	78	78		186	33							
14.	78	78		186	52							
15.	78	78		186	33							
16.	108	78		210	33							
17.	78	78		210	33							
18.	78	78		210	33							
19.	78	78		186	33							
20.	78	78		186	33							
21.	108	18		186	33							
22.	178	33		242	33							
23.	33	33		42	33							
24.	78	33		42	33							
25.	78	18		42	33							
26.	78	33		42	33							
27.	78	18		33	33							
28.	78	10		33	33							
29.	78			33	33							
30.	108			33	78							
31.	52			33	146							
Maximum.	108	108	33	210	146							
Minimum.	52	10	10	33	33							
Mean.	83	61	17	125	39							

NOTE.—No records of gage heights for dates in which discharges are not given.

Daily and monthly discharges, in liters per second, of Orani River near Cabiawan, Orani, Bataan, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	..	..	..	..	..	..	..	..	1,423	513	557	605
2.....	..	..	..	..	..	..	..	..	..	470	535	617
3.....	..	..	..	..	..	..	..	..	..	643	524	605
4.....	..	..	..	..	..	..	..	..	1,358	630	535	630
5.....	..	..	..	..	..	..	..	..	1,436	605	513	708
6.....	..	..	..	..	..	..	..	..	1,462	593	513	682
7.....	..	..	..	..	..	..	..	..	1,292	557	502	652
8.....	..	..	..	..	..	..	..	..	1,093	535	513	786
9.....	..	..	..	..	..	..	..	..	1,734	513	502	747
10.....	..	..	..	..	..	..	..	431	882	480	502	747
11.....	..	..	..	..	..	..	..	617	890	470	545	682
12.....	..	..	..	..	..	..	..	581	890	450	747	682
13.....	..	..	..	..	..	..	..	470	812	431	773	617
14.....	..	..	..	..	..	..	..	413	762	413	773	605
15.....	..	..	..	..	..	..	..	369	708	413	773	643
16.....	..	..	..	..	..	..	..	361	682	605	747	617
17.....	..	..	..	..	..	..	..	361	682	581	695	617
18.....	..	..	..	..	..	..	..	377	655	581	669	605
19.....	..	..	..	..	..	..	..	395	630	581	643	605
20.....	..	..	..	..	..	..	..	450	656	581	617	581
21.....	..	..	..	..	..	..	..	535	617	593	630	581
22.....	..	..	..	..	..	..	..	557	617	581	605	581
23.....	..	..	..	..	..	..	..	557	617	581	605	581
24.....	..	..	..	..	..	..	..	557	617	581	605	581
25.....	..	..	..	..	..	..	..	557	617	581	605	581
26.....	..	..	..	..	..	..	..	557	617	581	605	581
27.....	..	..	..	..	..	..	..	557	617	581	605	581
28.....	..	..	..	..	..	..	..	557	617	581	605	581
29.....	..	..	..	..	..	..	..	557	617	581	605	581
30.....	..	..	..	..	..	..	..	557	617	581	605	581
31.....	..	..	..	..	..	..	..	557	617	581	605	581
Maximum.....	..	..	..	..	..	..	..	825	1,462	643	838	786
Minimum.....	..	..	..	..	..	..	..	361	482	413	502	546
Mean.....	..	..	..	..	..	..	..	493	840	549	611	624

NOTE.—See footnote to discharge table for 1919.

Daily and monthly discharges, in liters per second, of Orani River near Cabañan, Orani, Bataan, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	569	413	266	49	36	.....	313	140	1,624	227	38	513
2.....	535	404	176	63	36	.....	227	140	1,452	227	38	347
3.....	535	404	176	49	36	.....	6,734	140	1,452	227	38	203
4.....	524	395	161	49	36	.....	3,000	140	1,452	227	38	485
5.....	513	395	161	36	36	.....	1,624	233	1,624	227	38	347
6.....	480	436	161	36	36	.....	1,624	10,912	1,452	227	38	347
7.....	480	436	161	36	36	.....	788	4,204	1,452	227	38	313
8.....	470	176	161	49	63	.....	485	1,796	693	180	107	313
9.....	470	161	161	36	36	.....	227	2,140	227	227	107	282
10.....	460	176	176	36	36	.....	203	1,796	227	227	49	282
11.....	513	161	133	36	36	.....	180	6,096	180	180	3,860	313
12.....	513	176	119	36	36	107	140	11,256	3,086	180	2,484	313
13.....	513	176	119	36	36	107	140	11,256	3,086	180	7,902	282
14.....	513	176	119	36	36	140	123	11,034	4,462	159	8,344	282
15.....	502	176	91	36	36	626	140	10,224	1,452	159	2,312	282
16.....	502	176	77	36	36	565	140	10,052	1,280	140	1,968	282
17.....	491	191	77	36	63	425	159	5,924	1,022	123	1,796	282
18.....	491	176	63	36	49	180	123	5,752	626	107	1,452	253
19.....	480	176	63	23	63	140	123	4,892	282	107	1,408	253
20.....	480	221	49	23	63	140	123	7,128	253	82	1,796	253
21.....	470	191	63	23	49	140	180	7,902	253	73	926	253
22.....	470	176	63	23	49	140	180	7,902	253	64	926	253
23.....	460	221	49	36	36	107	768	9,278	227	64	626	253
24.....	450	191	36	36	36	140	2,312	5,408	227	49	768	237
25.....	450	191	36	36	36	140	4,032	3,516	203	49	850	203
26.....	440	206	23	36	36	123	1,624	2,570	282	38	986	180
27.....	431	206	36	36	36	123	1,768	1,624	282	38	768	180
28.....	431	206	36	36	.....	425	425	1,452	227	38	626	180
29.....	431	.....	49	23	.....	463	227	1,452	227	38	.....	180
30.....	413	.....	36	23	.....	.....	180	1,565	.....	33	.....	180
31.....	413	.....	49	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maximum.....	569	431	206	63	63	626	6,784	11,256	4,462	282	7,902	513
Minimum.....	413	161	23	23	36	107	82	180	180	33	28	180
Mean.....	416	240	100	36	43	227	869	4,596	904	139	1,173	279

Note.—No record on days for which discharge is not given. Discharge determined from fairly well-defined rating curves. Records fair below 4,400 second-liters.

Daily and monthly discharges, in liters per second, of Orani River near Cabiawan, Orani, Bataan, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	180	107	82	.....	.....	.....	.....	4,982	262	1,867	169	514
2.....	180	107	82	.....	.....	.....	.....	3,452	262	1,738	169	476
3.....	180	107	82	.....	.....	.....	.....	2,880	262	1,675	169	476
4.....	180	94	82	.....	.....	.....	.....	1,738	262	1,430	169	514
5.....	159	94	82	.....	.....	.....	.....	1,933	296	1,255	330	514
6.....	159	107	82	.....	.....	.....	.....	1,738	296	1,000	231	514
7.....	159	107	82	.....	.....	.....	.....	1,430	296	1,000	169	576
8.....	159	140	82	.....	.....	.....	.....	1,203	262	562	169	438
9.....	159	180	82	.....	.....	.....	2,000	1,000	262	960	200	438
10.....	140	159	82	.....	.....	.....	1,738	551	364	551	200	364
11.....	140	140	94	.....	.....	.....	6,730	759	296	759	169	438
12.....	140	140	94	.....	.....	.....	2,278	904	330	759	169	438
13.....	140	123	94	.....	.....	.....	1,675	714	514	714	169	438
14.....	123	107	82	.....	.....	.....	1,203	1,152	590	759	169	438
15.....	123	107	82	.....	.....	.....	851	590	3	538	138	400
16.....	123	107	82	.....	.....	.....	672	594	7,235	672	138	400
17.....	123	140	94	.....	.....	.....	590	159	12,710	630	364	400
18.....	107	159	82	.....	.....	.....	590	1,867	1,550	590	364	364
19.....	107	140	82	.....	.....	.....	590	1,255	5,650	582	364	364
20.....	107	140	82	.....	.....	.....	1,101	1,255	3,350	590	364	364
21.....	123	123	82	.....	.....	.....	1,050	1,050	2,320	514	380	514
22.....	94	107	82	.....	.....	.....	1,050	900	2,387	476	262	514
23.....	107	107	82	.....	.....	.....	1,050	894	1,867	438	231	514
24.....	107	107	82	.....	.....	.....	5,203	534	1,953	400	231	476
25.....	94	94	73	.....	.....	.....	5,334	514	1,491	400	380	438
26.....	94	94	73	.....	.....	.....	7,738	438	1,252	400	264	364
27.....	94	94	73	.....	.....	.....	11,790	438	1,252	364	264	400
28.....	140	94	82	.....	.....	.....	11,790	364	1,252	364	264	400
29.....	107	.....	82	.....	.....	.....	2,862	296	3,667	364	514	400
30.....	107	.....	82	.....	.....	.....	2,000	296	3,120	364	514	364
31.....	107	.....	82	.....	.....	.....	3,973	262	.....	231	.....	364
Maximum	180	180	94	.....	.....	.....	11,790	4,982	12,710	1,867	.....	514
Minimum	.....	94	73	.....	.....	.....	590	262	2,107	231	138	438
Mean	131	119	83	.....	.....	.....	2,670	1,243	2,107	761	253	438

NOTE.—See footnote to discharge table for 1921.



## BATAAN PROVINCE

## TALISAY RIVER, BALANGA

LOCATION.—About 8 km. by trail west of Orion, and about the same distance from Pilar. It is near the intake of canal Valecos in the sitio Batugan.

RECORDS AVAILABLE.—From February 10, 1921, to December 31, 1922. Also from April 26, 1909, to March 23, 1912.

GAGE.—A standard metric gage board was securely fastened to a tree on the left bank of the river directly opposite the intake of Valecos ditch.

DISCHARGE MEASUREMENTS.—Made by wading at a short distance below the gage.

CHANNEL AND BANKS.—One channel at low water stage, two at high water stage, of uniformly curved course for 10 m. above and 150 m. below the gaging section. Right bank high and wooded. At measuring section stream bed composed of coarse gravel and sand. Not very shifting.

EXTREMES OF DISCHARGE.—Maximum discharge during period of observation, 95,860 second-liters on August 2, 1922; minimum discharge, 1,020 second-liters on April 6-8 and June 12-13, 1911.

DIVERSIONS.—One above the station.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge determined from a fairly well-defined curve. Applicable from April 26, 1909, to March 23, 1912. Gage read twice daily.

*Discharge measurements of Talisay River, near Batugan, Balanga, Bataan*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1909</b>				
February 8 . . . . .	C. T. Brady . . . . .		2,000	
April 21 . . . . .	do. . . . .	.08	1,600	
April 27 . . . . .	do. . . . .	.15	1,750	
May 4 . . . . .	do. . . . .	.17	2,100	
December 27 . . . . .	S. G. Cutler . . . . .	21	3,691	
<b>1910</b>				
January 11 . . . . .	do. . . . .	.20	3,032	
January 28 . . . . .	do. . . . .	.15	2,526	
February 24 . . . . .	do. . . . .	.12	2,362	
March 1 . . . . .	do. . . . .	.10	1,478	
April 16 . . . . .	do. . . . .	.10	1,423	
May 4 . . . . .	do. . . . .	.10	1,583	
May 31 . . . . .	do. . . . .	.35	5,374	
June 22 . . . . .	do. . . . .	.12	1,858	
July 6 . . . . .	do. . . . .	.17	2,406	
<b>1911</b>				
December 12 . . . . .	do. . . . .	22	2,872	
<b>1921</b>				
February 10 . . . . .	R. and C . . . . .	1 00	2,144	
February 11 . . . . .	do. . . . .	88	1,143	
March 16 . . . . .	Castillo . . . . .	94	1,689	
April 13 . . . . .	do. . . . .	.93	1,533	
May 26 . . . . .	do. . . . .	.90	1,167	
June 12 . . . . .	do. . . . .	.90	1,050	
July 28 . . . . .	do. . . . .	1 28	7,446	
September 27 . . . . .	do. . . . .	1 37	10,456	
December 29 . . . . .	do. . . . .	1 19	3,652	

*Discharge measurements of Talisay River, near Batugan, Balanga,  
Bataan—Continued*

Date	Made by—	Gage height (meters)	Discharge (second- liters)	Remarks
<b>1922</b>				
March 30.....	Julian Roxas.....	1.04	1,471	
April 1.....	do.....	1.04	1,477	
June 26.....	do.....	1.01	1,832	
July 23.....	do.....	1.67	16,931	
July 23.....	do.....	1.67	15,720	
August 22.....	do.....	1.70	16,485	
August 22.....	do.....	1.70	16,653	
November 6.....	do.....	1.22	6,840	
November 14.....	do.....	1.15	4,186	
December 13.....	do.....	1.16	3,857	

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	.....	.....	.....	.....	2,600	1,880	1,740	18,200	3,860	7,140	6,600	4,355
2	.....	.....	.....	.....	2,300	1,610	1,740	15,260	3,540	6,780	6,065	4,190
3	.....	.....	.....	.....	2,300	1,610	1,740	13,840	3,220	9,120	5,715	4,190
4	.....	.....	.....	.....	2,450	1,490	1,740	24,680	3,380	11,640	5,715	4,025
5	.....	.....	.....	.....	2,300	1,360	1,740	15,980	3,060	7,780	5,030	3,700
6	.....	.....	.....	.....	2,300	1,360	4,355	22,700	3,060	7,140	5,030	3,700
7	.....	.....	.....	.....	2,750	1,360	5,030	18,740	3,220	13,620	9,300	3,700
8	.....	.....	.....	.....	2,750	1,360	4,190	22,700	3,220	13,620	20,540	3,700
9	.....	.....	.....	.....	2,450	1,360	4,190	18,740	3,220	13,620	13,440	3,700
10	.....	.....	.....	.....	4,690	1,360	6,240	10,920	17,580	13,980	12,360	3,700
11	.....	.....	.....	.....	3,540	1,360	4,690	7,680	12,720	8,040	19,120	8,860
12	.....	.....	.....	.....	2,750	1,360	4,190	8,760	18,740	7,140	7,860	4,355
13	.....	.....	.....	.....	2,450	1,360	10,560	7,860	21,620	6,780	6,780	4,355
14	.....	.....	.....	.....	2,300	1,360	13,260	7,320	12,000	5,540	6,065	6,420
15	.....	.....	.....	.....	2,450	1,360	8,220	6,600	9,120	6,065	13,980	5,030
16	.....	.....	.....	.....	1,880	1,360	5,540	6,420	8,220	5,715	11,280	4,680
17	.....	.....	.....	.....	2,300	1,240	5,715	6,065	15,600	5,890	10,200	4,025
18	.....	.....	.....	.....	3,380	3,060	5,715	6,065	15,960	6,065	7,680	4,025
19	.....	.....	.....	.....	1,880	8,940	6,065	6,065	31,160	6,065	7,140	3,700
20	.....	.....	.....	.....	1,740	7,320	5,715	5,715	23,100	6,420	6,780	3,700
21	.....	.....	.....	.....	1,610	6,960	4,190	5,970	31,700	5,715	6,420	3,700
22	.....	.....	.....	.....	1,740	8,760	4,355	5,200	21,260	5,715	5,715	3,700
23	.....	.....	.....	.....	1,740	5,715	4,025	4,520	15,600	5,030	5,540	3,700
24	.....	.....	.....	.....	1,740	5,030	4,690	4,355	13,620	30,440	5,370	3,700
25	.....	.....	.....	.....	1,360	3,380	3,060	4,025	12,180	14,520	5,030	3,700
26	.....	.....	.....	.....	1,360	2,600	5,370	4,025	10,740	11,100	4,690	3,540
27	.....	.....	.....	.....	2,020	2,600	25,760	4,025	10,740	8,940	4,355	3,060
28	.....	.....	.....	.....	2,020	2,600	28,640	4,025	9,660	7,860	5,715	3,060
29	.....	.....	.....	.....	2,160	3,380	31,880	4,025	8,940	7,860	5,030	3,060
30	.....	.....	.....	.....	2,300	2,450	23,780	4,025	8,400	7,500	4,355	3,060
31	.....	.....	.....	.....	2,600	1,880	23,780	4,190	.....	6,600	.....	3,060
Maximum	.....	.....	.....	2,300	6,780	8,940	31,880	24,680	31,700	30,440	20,540	6,420
Minimum	.....	.....	.....	2,020	1,360	1,240	1,740	4,025	3,060	5,030	4,355	3,060
Mean...	.....	.....	.....	2,104	2,478	2,856	8,449	9,248	12,656	8,848	7,398	3,924

Norw.—Daily discharges determined from a fairly well-defined curve, applicable from April 26 to December 31, 1909.

Daily and monthly discharges, in liters per second, of Talisay River near Batugan, Balanga, Bataan, for the year 1910

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	2,750	1,880	1,740	2,600	1,610	4,520	4,520	7,680	10,200	18,200	4,190	3,380
2.....	2,750	1,880	1,610	2,600	1,360	3,700	4,093	6,960	13,800	15,060	4,190	3,540
3.....	2,750	1,880	1,480	2,600	1,480	2,700	3,700	10,960	24,700	10,200	4,355	3,700
4.....	2,750	1,880	1,480	2,750	1,480	2,750	3,700	16,960	21,200	16,860	4,190	3,700
5.....	2,750	1,880	1,480	2,900	1,480	2,750	2,450	6,780	19,400	13,340	3,690	3,720
6.....	2,750	1,880	1,480	2,750	1,610	2,600	2,450	5,540	19,400	12,180	3,705	3,720
7.....	2,750	1,880	1,480	2,600	1,480	2,090	2,300	5,200	15,780	11,560	3,700	3,720
8.....	2,750	1,880	1,480	2,450	1,480	2,090	2,300	4,690	11,100	10,560	3,700	3,720
9.....	2,450	1,880	1,480	2,450	1,480	2,600	2,020	7,320	12,180	13,980	3,700	3,720
10.....	1,880	1,880	1,480	2,160	1,360	1,880	1,880	9,480	12,180	12,000	3,700	3,060
11.....	1,880	1,880	1,480	2,160	1,480	1,740	1,740	12,360	9,480	9,480	3,700	2,900
12.....	2,160	1,880	1,480	2,020	1,480	1,740	1,880	17,940	7,860	8,520	3,700	2,900
13.....	2,160	1,880	1,610	1,880	1,480	1,740	3,860	12,900	6,420	9,660	5,540	3,220
14.....	2,160	1,880	1,610	1,480	1,480	1,740	3,380	12,720	7,140	8,220	5,890	2,900
15.....	2,160	1,880	1,610	1,480	1,740	1,740	3,380	10,560	7,680	7,500	4,690	2,600
16.....	2,160	1,880	1,610	1,480	1,740	1,610	17,940	8,580	7,680	7,500	4,690	2,600
17.....	2,160	1,880	1,610	2,900	1,610	1,480	12,180	7,140	6,780	6,420	5,715	2,600
18.....	2,160	1,880	1,610	2,900	1,610	1,480	6,960	5,890	6,780	6,420	4,355	2,600
19.....	2,160	1,880	1,480	2,300	1,740	1,480	5,200	5,370	7,320	5,890	4,025	2,600
20.....	2,160	1,880	1,480	2,020	1,740	1,480	5,200	5,540	6,780	5,715	3,860	2,450
21.....	2,160	1,880	1,480	2,020	2,020	1,480	4,520	4,860	9,300	5,540	5,030	2,300
22.....	2,160	1,880	1,610	2,020	1,880	1,880	3,380	4,355	7,500	5,370	8,940	2,300
23.....	2,160	1,880	1,610	2,020	1,610	1,480	2,750	12,180	7,140	5,030	5,715	2,300
24.....	2,160	1,880	1,610	2,600	2,300	1,480	2,600	9,480	9,660	5,030	4,690	2,300
25.....	2,160	1,880	5,370	7,320	6,780	1,480	2,450	6,960	7,320	4,860	4,190	2,300
26.....	1,880	1,880	5,200	4,025	10,380	1,480	2,450	6,780	6,780	4,860	4,025	2,300
27.....	1,880	1,880	2,900	2,900	6,245	2,450	2,160	5,030	21,080	4,520	3,860	3,700
28.....	1,880	1,880	2,750	2,450	13,260	3,220	2,020	4,860	23,780	4,520	3,540	2,600
29.....	1,880	1,880	2,600	2,020	13,440	2,600	2,160	7,320	20,720	4,355	3,540	2,600
30.....	1,880	1,880	2,600	2,020	8,400	2,600	5,370	6,420	.....	4,190	.....	2,600
31.....	1,880	1,880	2,600	.....	5,715	.....	.....	.....	.....	.....	.....	.....
Maximum.....	2,750	1,880	5,370	7,320	13,440	4,520	17,940	17,940	27,200	18,200	8,940	3,700
Minimum.....	1,880	1,880	1,480	1,480	1,360	1,480	1,740	4,355	6,420	4,190	3,540	2,300
Mean.....	2,268	1,880	1,975	2,524	3,317	2,107	4,058	7,912	12,325	8,645	4,433	2,898

NOTE.—Daily discharges determined from a fairly well-defined rating curve, applicable throughout the year.

Daily and monthly discharges, in liters per second, of Talisay River near Batugan, Balanga, for the year 1911

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	2,600	1,740	1,480	1,240	3,380	2,160	3,220	29,540	16,140	18,740	4,860	3,220
2.....	2,450	1,740	1,480	1,240	3,380	1,880	32,240	28,820	15,060	14,700	4,690	3,220
3.....	2,300	1,740	1,480	1,240	2,750	1,740	15,960	25,400	13,620	12,540	3,220	3,220
4.....	2,300	1,740	1,480	1,240	2,600	1,610	10,200	21,620	12,720	11,250	4,520	3,220
5.....	2,300	1,880	1,480	1,240	2,300	1,480	16,220	11,400	11,400	10,200	4,520	3,220
6.....	2,300	2,450	1,480	1,020	2,300	1,130	5,690	10,200	10,200	8,300	4,520	3,220
7.....	2,300	2,450	1,480	1,020	2,300	1,130	5,690	10,200	10,200	8,300	4,520	3,220
8.....	2,300	2,450	1,480	1,020	2,300	1,130	5,690	10,200	10,200	8,300	4,520	3,220
9.....	2,300	2,450	1,480	1,020	2,300	1,130	5,690	10,200	10,200	8,300	4,520	3,220
10.....	2,300	2,450	1,480	1,020	2,300	1,130	5,690	10,200	10,200	8,300	4,520	3,220
11.....	2,300	2,450	1,480	1,020	2,300	1,130	5,690	10,200	10,200	8,300	4,520	3,220
12.....	2,300	2,450	1,480	1,020	2,300	1,130	5,690	10,200	10,200	8,300	4,520	3,220
13.....	2,300	2,450	1,480	1,020	2,300	1,130	5,690	10,200	10,200	8,300	4,520	3,220
14.....	2,300	2,450	1,480	1,020	2,300	1,130	5,690	10,200	10,200	8,300	4,520	3,220
15.....	2,300	2,450	1,480	1,020	2,300	1,130	5,690	10,200	10,200	8,300	4,520	3,220
16.....	2,300	2,450	1,480	1,020	2,300	1,130	5,690	10,200	10,200	8,300	4,520	3,220
17.....	2,300	2,450	1,480	1,020	2,300	1,130	5,690	10,200	10,200	8,300	4,520	3,220
18.....	2,300	2,450	1,480	1,020	2,300	1,130	5,690	10,200	10,200	8,300	4,520	3,220
19.....	2,300	2,450	1,480	1,020	2,300	1,130	5,690	10,200	10,200	8,300	4,520	3,220
20.....	2,300	2,450	1,480	1,020	2,300	1,130	5,690	10,200	10,200	8,300	4,520	3,220
21.....	1,740	1,480	1,480	2,020	2,600	2,020	21,440	23,780	10,560	6,960	3,860	2,900
22.....	1,740	1,480	1,480	2,020	2,600	2,020	21,440	23,780	10,560	6,960	3,860	2,900
23.....	1,740	1,480	1,480	2,020	2,600	2,020	21,440	23,780	10,560	6,960	3,860	2,900
24.....	1,740	1,480	1,480	2,020	2,600	2,020	21,440	23,780	10,560	6,960	3,860	2,900
25.....	1,740	1,480	1,480	2,020	2,600	2,020	21,440	23,780	10,560	6,960	3,860	2,900
26.....	1,740	1,480	1,480	2,020	2,600	2,020	21,440	23,780	10,560	6,960	3,860	2,900
27.....	1,740	1,480	1,480	2,020	2,600	2,020	21,440	23,780	10,560	6,960	3,860	2,900
28.....	1,740	1,480	1,480	2,020	2,600	2,020	21,440	23,780	10,560	6,960	3,860	2,900
29.....	1,740	1,480	1,480	2,020	2,600	2,020	21,440	23,780	10,560	6,960	3,860	2,900
30.....	1,740	1,480	1,480	2,020	2,600	2,020	21,440	23,780	10,560	6,960	3,860	2,900
31.....	1,740	1,480	1,480	2,020	2,600	2,020	21,440	23,780	10,560	6,960	3,860	2,900
Maximum.....	2,600	2,450	1,480	9,840	8,220	20,180	45,920	34,940	28,460	18,740	4,860	3,540
Minimum.....	2,300	1,480	1,480	1,020	1,740	1,020	2,900	12,180	6,780	4,860	3,220	2,600
Mean.....	1,996	1,756	1,412	2,911	3,379	4,059	28,328	20,692	10,887	8,008	3,927	2,978

Note.—Daily discharges determined from a fairly well-defined, applicable throughout the year.

*Daily and monthly discharges, in liters per second, of Tulisay River near Batugan, Balanga, for the year 1912*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.	2,600	2,750	1,880	.....	.....	.....	.....	.....	.....	.....	.....	.....
2.	2,600	2,750	1,880	.....	.....	.....	.....	.....	.....	.....	.....	.....
3.	2,600	2,750	1,740	.....	.....	.....	.....	.....	.....	.....	.....	.....
4.	2,600	2,750	1,880	.....	.....	.....	.....	.....	.....	.....	.....	.....
5.	3,060	2,900	1,740	.....	.....	.....	.....	.....	.....	.....	.....	.....
6.	3,060	3,060	1,880	.....	.....	.....	.....	.....	.....	.....	.....	.....
7.	2,450	2,900	2,020	.....	.....	.....	.....	.....	.....	.....	.....	.....
8.	2,450	2,750	2,020	.....	.....	.....	.....	.....	.....	.....	.....	.....
9.	2,450	2,750	2,020	.....	.....	.....	.....	.....	.....	.....	.....	.....
10.	2,450	2,750	2,020	.....	.....	.....	.....	.....	.....	.....	.....	.....
11.	3,540	2,750	2,020	.....	.....	.....	.....	.....	.....	.....	.....	.....
12.	3,220	2,600	2,020	.....	.....	.....	.....	.....	.....	.....	.....	.....
13.	3,060	2,300	2,020	.....	.....	.....	.....	.....	.....	.....	.....	.....
14.	2,900	2,300	2,020	.....	.....	.....	.....	.....	.....	.....	.....	.....
15.	2,750	2,300	1,880	.....	.....	.....	.....	.....	.....	.....	.....	.....
16.	2,750	2,300	1,880	.....	.....	.....	.....	.....	.....	.....	.....	.....
17.	2,750	2,300	1,880	.....	.....	.....	.....	.....	.....	.....	.....	.....
18.	2,750	2,300	1,880	.....	.....	.....	.....	.....	.....	.....	.....	.....
19.	3,060	2,160	1,880	.....	.....	.....	.....	.....	.....	.....	.....	.....
20.	3,060	2,020	1,880	.....	.....	.....	.....	.....	.....	.....	.....	.....
21.	3,060	2,160	1,740	.....	.....	.....	.....	.....	.....	.....	.....	.....
22.	3,060	2,020	1,740	.....	.....	.....	.....	.....	.....	.....	.....	.....
23.	3,060	1,880	1,740	.....	.....	.....	.....	.....	.....	.....	.....	.....
24.	2,750	1,880	1,740	.....	.....	.....	.....	.....	.....	.....	.....	.....
25.	2,750	1,880	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
26.	2,750	1,740	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
27.	2,750	1,740	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
28.	2,750	1,740	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
29.	2,750	1,740	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
30.	2,750	1,740	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
31.	2,750	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maximum	3,540	3,060	2,020	.....	.....	.....	.....	.....	.....	.....	.....	.....
Minimum	2,450	1,740	1,740	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mean	2,803	2,347	1,899	.....	.....	.....	.....	.....	.....	.....	.....	.....

NORG.—Daily discharges determined from a fairly well-defined curve, applicable to March 23, 1912.

Daily and monthly discharges, in liters per second, of Talsay River near Aningay, Balanga, Bataan, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....			1,670	2,070	1,410	1,670	7,450	2,650	19,560	9,650	5,490	8,280
2.....			1,670	1,930	1,670	1,410	5,870	1,930	15,640	8,740	5,130	7,840
3.....			1,670	1,930	1,670	1,410	4,770	1,170	13,280	8,500	5,130	7,840
4.....			1,670	2,210	1,410	1,410	3,120	2,210	11,660	8,540	5,210	6,920
5.....			1,930	2,210	1,410	1,410	33,130	2,210	14,420	8,680	5,880	6,970
6.....			2,210	1,930	1,800	1,410	1,930	69,330	12,930	8,580	4,770	6,970
7.....			2,210	2,210	1,670	1,410	1,930	28,870	11,660	7,870	4,770	6,970
8.....			2,210	2,210	1,670	1,410	5,490	13,000	15,640	7,870	4,950	6,960
9.....		2,210	1,670	2,070	1,800	1,410	4,080	10,630	13,280	7,660	5,870	6,160
10.....		1,930	1,670	2,070	1,800	1,410	2,500	10,630	12,730	7,450	7,930	5,960
11.....		2,800	1,410	2,070	1,670	1,290	2,500	23,190	11,920	7,450	43,210	5,760
12.....		1,670	1,670	1,670	1,800	1,170	2,500	28,860	16,580	7,240	56,570	5,760
13.....		1,930	1,670	1,930	1,800	1,670	2,210	42,430	21,710	7,030	29,950	5,760
14.....		1,800	2,210	1,670	1,670	2,850	2,500	94,600	22,450	6,630	18,890	5,760
15.....		2,210	2,210	2,070	1,670	2,500	2,500	113,100	16,900	6,250	16,030	5,560
16.....						2,500	2,500	74,250	14,420	5,870	16,560	5,560
17.....			2,210	1,930	1,670	2,500	2,500	53,160	12,730	5,870	12,620	5,560
18.....		1,670	2,210	1,930	1,800	2,210	2,500	98,300	12,460	5,870	11,330	5,360
19.....		2,500	2,210	2,210	1,930	2,210	2,210	44,650	11,660	5,870	9,380	5,360
20.....		1,670	2,210	2,210	1,930	2,210	2,500	40,950	12,730	5,870	9,170	5,360
21.....		2,210	2,350	1,800	1,930	1,670	2,500	49,830	13,280	5,870	9,840	5,360
22.....		1,930	1,670	1,800	1,930	1,930	2,500	76,100	11,920	5,870	9,840	5,360
23.....		1,410	1,800	1,930	2,070	1,930	16,900	73,140	11,140	5,490	12,100	4,970
24.....		1,670	2,210	2,070	1,540	2,070	34,290	41,690	10,630	5,130	10,360	4,780
25.....		2,070	2,210	1,800	1,410	1,930	40,950	28,370	9,650	5,130	13,280	4,590
26.....		2,070	2,070	1,380	1,410	1,930	8,740	22,450	9,410	5,130	13,280	4,590
27.....		1,670	2,070	1,800	1,540	1,800	4,770	25,040	19,180	5,130	10,690	4,590
28.....			2,210	1,800	1,540	7,870	5,490	28,870	8,740	5,870	9,880	4,590
29.....			2,210	1,930	1,410	12,730	3,420	28,820	8,740	5,580	8,720	4,220
30.....												
31.....												
Maximum.....		2,800	2,350	2,210	2,070	12,730	40,950	113,100	22,450	9,650	56,570	8,280
Minimum.....		1,410	1,410	1,570	1,410	1,170	2,210	1,170	8,740	5,130	4,770	4,220
Mean.....		1,935	1,939	1,957	1,670	2,328	7,605	37,240	13,295	6,735	12,362	5,784

Daily and monthly discharges, in liters per second, of Talisay River near Aningay, Balanga, Bataan, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	4,400	2,500	1,890	.....	.....	.....	.....	85,620	5,760	23,710	4,970	3,860
2.....	4,400	2,340	2,040	.....	.....	.....	.....	{	.....	25,270	4,040	3,680
3.....	4,220	2,820	2,190	.....	.....	.....	.....	49,660	7,620	15,030	3,500	4,970
4.....	3,330	2,820	2,190	.....	.....	.....	.....	23,780	6,780	13,430	3,500	4,160
5.....	3,500	2,190	1,890	.....	.....	.....	.....	22,270	5,760	11,580	3,500	5,160
6.....	3,600	2,820	2,190	.....	.....	.....	.....	17,320	5,660	11,080	4,220	5,760
7.....	3,160	2,500	1,890	.....	.....	.....	27,610	16,650	5,360	9,880	3,560	4,590
8.....	3,160	2,190	1,890	.....	.....	.....	31,510	13,710	5,360	9,170	3,860	4,590
9.....	3,160	2,500	1,890	.....	.....	.....	19,560	11,080	4,970	10,600	3,860	4,220
10.....	2,990	2,340	1,890	.....	.....	.....	11,080	13,430	5,360	9,640	3,500	4,220
11.....	2,620	2,500	1,890	.....	.....	.....	74,410	10,600	9,640	8,940	3,860	3,860
12.....	3,160	1,740	1,890	.....	.....	.....	26,440	9,640	6,570	8,720	3,860	3,860
13.....	3,160	2,040	1,890	.....	.....	.....	12,100	.....	13,990	7,840	3,500	3,860
14.....	2,660	2,190	2,190	.....	.....	.....	8,720	41,260	20,270	7,410	3,680	3,500
15.....	2,660	2,040	1,890	.....	.....	.....	7,410	16,030	42,430	7,410	3,860	3,500
16.....	2,990	2,040	1,890	.....	.....	.....	6,570	12,620	29,950	10,120	3,680	3,500
17.....	3,500	2,190	1,600	.....	.....	.....	5,560	24,490	65,050	8,280	3,860	3,500
18.....	2,990	2,500	1,600	.....	.....	.....	4,780	31,510	32,350	7,200	3,860	3,500
19.....	2,820	1,600	1,600	.....	.....	.....	4,400	31,510	64,660	7,200	3,860	3,500
20.....	2,990	1,740	1,600	.....	.....	.....	5,560	26,050	55,300	6,570	3,860	3,500
21.....	2,990	1,890	1,600	.....	.....	.....	5,160	19,910	38,530	6,570	3,860	3,500
22.....	2,820	2,040	1,600	.....	.....	.....	12,620	15,720	26,660	6,780	3,860	3,860
23.....	2,600	2,040	1,600	.....	.....	.....	15,560	14,850	18,560	7,620	3,500	4,220
24.....	2,600	2,190	1,600	.....	.....	.....	18,560	13,990	22,930	4,970	3,500	3,500
25.....	2,600	2,040	1,890	.....	.....	.....	18,560	10,360	17,280	4,400	3,500	3,860
26.....	2,990	2,040	1,740	.....	.....	.....	36,190	9,640	13,990	4,400	3,860	3,500
27.....	2,600	2,040	2,040	.....	.....	.....	47,110	8,500	12,360	4,590	3,860	3,500
28.....	2,600	2,190	1,740	.....	.....	.....	90,760	7,840	13,710	4,970	3,500	3,500
29.....	2,660	.....	1,740	.....	.....	.....	27,610	6,990	40,090	5,160	3,860	3,500
30.....	2,500	.....	1,740	.....	.....	.....	21,600	31,900	31,900	4,590	3,860	3,160
31.....	2,190	.....	1,740	.....	.....	.....	68,560	6,160	.....	.....	.....	.....
Maximum.....	4,400	2,820	2,190	.....	.....	.....	74,410	95,860	92,350	25,270	5,160	6,160
Minimum.....	2,190	1,600	1,600	.....	.....	.....	4,400	6,160	24,970	4,040	3,500	3,160
Mean.....	3,028	2,211	1,839	.....	.....	.....	53,096	21,773	22,396	9,008	3,868	3,597



## BATAAN PROVINCE

## TALISAY RIVER, PILAR

LOCATION.—About 708 m. S. 55° 45' W. of km. Post No. 2 of the Balanga South Road.

RECORDS AVAILABLE.—From June 10, 1917, to July 28, 1919, with breaks from January 1–12, from February 16 to April 6, and from July 20 to 22, 1919. Breaks in records also on Sundays and legal holidays.

GAGE.—Standard metric gage board vertically attached to wooden post driven into river bed, at right bank of river.

DISCHARGE MEASUREMENTS.—Made by wading at section of gage.

CHANNEL AND BANKS.—Channel only one at all stages; straight for 500 m. above and below station. Banks of sandy texture; stream bed of sand and gravel.

EXTREMES OF DISCHARGE.—Maximum discharge during period of observation, 85,950 second-liters on June 29, 1918; minimum discharge, 1,120 second-liters on June 6, 1919.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation and water right purposes.

ACCURACY.—Gage height readings from June, 1917, to March 23, 1918, seem to be affected by tide, hence discharges cannot be relied upon much. This gage was formerly established at Balanga but was transferred to Pilar due to former station being subject to tidal influences. Daily discharge determined from well-defined curves. Gage read twice daily.

*Discharge measurements of Talisay River, near Aningay, Pilar, Bataan*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1918</b>				
March 7	D. Bascara	.24	1,275	
March 22	do.	.30	1,730	
April 4	do.	.12	1,360	
April 11	do.	.09	1,460	
April 25	do.	.09	1,420	
May 9	do.	.10	1,660	
May 16	do.	.12	1,812	
May 23	do.	.10	1,609	
May 30	do.	.11	1,835	
June 6	do.	.13	2,119	
June 13	do.	.22	1,988	
June 20	do.	.12	2,807	
June 27	do.	.18	2,434	
July 4	do.	.44	8,472	
August 8	do.	.44	8,726	
August 29	do.	.62	26,114	
September 19	do.	.60	10,929	
September 26	do.	.52	12,742	
October 3	do.	.42	7,385	
October 10	do.	.46	8,381	
October 24	do.	.68	9,905	
October 31	do.	.52	8,443	
November 7	do.	.38	6,113	
November 17	do.	.34	6,051	
November 21	do.	.32	5,148	
November 28	do.	.30	5,369	
December 5	P. J.	.30	4,934	
December 12	do.	.30	5,252	
December 19	do.	.30	3,975	
December 26	do.	.28	4,450	
<b>1921</b>				
February 17	I. Villo		520	

Daily and monthly discharges, in liters per second, of Tulsay River near Aningay, Pilar, Bataan, for the year 1917

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	.....	.....	.....	.....	.....	.....	12,650	32,630	19,390	17,060	10,030	8,415
2	.....	.....	.....	.....	.....	.....	15,100	23,220	16,140	14,230	9,395	8,660
3	.....	.....	.....	.....	.....	.....	16,990	34,800	13,110	13,070	9,270	10,160
4	.....	.....	.....	.....	.....	.....	16,440	21,670	12,790	11,960	10,030	10,230
5	.....	.....	.....	.....	.....	.....	16,600	18,360	12,230	11,570	9,645	10,230
6	.....	.....	.....	.....	.....	.....	16,990	18,920	11,820	11,670	9,645	10,230
7	.....	.....	.....	.....	.....	.....	16,440	14,375	10,830	11,530	9,645	10,290
8	.....	.....	.....	.....	.....	.....	13,110	13,650	8,780	33,660	10,250	8,415
9	.....	.....	.....	.....	.....	.....	11,110	13,070	10,420	24,880	10,880	10,030
10	.....	.....	.....	.....	.....	15,740	12,370	12,510	10,230	19,230	10,560	11,110
11	.....	.....	.....	.....	.....	7,290	13,360	13,110	11,250	17,840	9,395	11,110
12	.....	.....	.....	.....	.....	8,070	23,020	16,840	13,795	16,440	10,695	12,790
13	.....	.....	.....	.....	.....	10,290	41,000	16,290	15,990	13,650	10,030	12,630
14	.....	.....	.....	.....	.....	10,030	23,020	17,220	14,375	15,100	8,660	12,630
15	.....	.....	.....	.....	.....	10,290	19,540	17,580	14,230	13,495	10,560	12,370
16	.....	.....	.....	.....	.....	10,965	19,230	17,220	13,070	13,210	10,030	10,880
17	.....	.....	.....	.....	.....	13,110	24,880	16,750	8,540	14,665	8,415	7,950
18	.....	.....	.....	.....	.....	13,740	46,580	23,950	8,300	12,930	8,070	8,070
19	.....	.....	.....	.....	.....	13,455	37,900	31,390	8,415	12,230	7,840	7,950
20	.....	.....	.....	.....	.....	11,110	25,810	21,780	8,300	11,530	7,950	7,950
21	.....	.....	.....	.....	.....	10,560	19,230	15,840	9,520	11,530	7,950	7,950
22	.....	.....	.....	.....	.....	8,540	14,230	13,110	9,270	16,290	7,950	9,770
23	.....	.....	.....	.....	.....	7,950	12,930	12,510	10,160	13,070	8,415	10,030
24	.....	.....	.....	.....	.....	6,625	12,230	.....	10,420	12,650	8,660	12,510
25	.....	.....	.....	.....	.....	7,620	12,090	11,950	11,250	13,795	12,650	13,070
26	.....	.....	.....	.....	.....	10,160	12,930	12,230	11,690	14,810	12,790	13,070
27	.....	.....	.....	.....	.....	10,290	13,110	13,070	14,375	14,955	12,090	13,070
28	.....	.....	.....	.....	.....	10,290	25,190	15,545	20,850	12,510	14,955	10,290
29	.....	.....	.....	.....	.....	9,675	25,810	16,290	25,600	10,365	10,695	10,290
30	.....	.....	.....	.....	.....	10,030	.....	18,920	21,160	10,595	12,370	.....
31	.....	.....	.....	.....	.....	.....	.....	31,700	.....	10,160	.....	.....
Maximum.	.....	.....	.....	.....	.....	15,740	46,580	34,800	23,600	33,560	14,965	13,070
Minimum.	.....	.....	.....	.....	.....	6,625	11,110	11,950	8,300	10,160	7,840	7,950
Mean.	.....	.....	.....	.....	.....	10,155	19,583	19,210	13,378	14,592	9,984	10,468

Daily and monthly discharges, in liters per second, of Talisay River near Aningay, Pilar, Bataan, for the year 1918

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	7,730	4,540	4,900	1,400	2,960	2,320	23,640	11,390	16,910	2,800	3,820	2,160
2.....	7,620	4,450	4,900	1,400	2,640	1,550	15,690	10,560	20,640	2,560	3,640	2,160
3.....	7,730	4,450	4,900	2,075	2,000	1,550	9,270	9,770	19,700	2,640	2,720	2,480
4.....	7,730	5,905	4,900	1,850	1,700	1,550	8,300	7,620	38,210	2,640	2,640	2,480
5.....	7,840	7,950	6,960	1,850	1,700	2,000	5,890	7,400	44,100	2,800	2,480	2,480
6.....	7,840	8,540	8,415	1,850	1,400	1,850	5,890	6,960	21,470	2,800	2,320	2,480
7.....	10,160	10,160	8,660	1,400	1,850	1,850	15,990	6,740	15,390	2,720	2,240	2,480
8.....	10,290	8,660	9,270	1,400	1,850	2,000	29,220	6,520	11,950	2,800	2,480	2,480
9.....	10,695	8,660	7,840	1,550	2,000	1,700	30,460	6,100	13,070	2,800	2,160	2,480
10.....	8,300	8,660	6,625	1,550	1,850	2,160	44,410	36,970	16,290	3,040	2,160	2,480
11.....	8,185	4,450	5,880	1,400	1,850	3,470	30,150	18,770	16,600	2,720	2,075	2,320
12.....	5,680	4,450	5,880	2,000	2,160	2,640	22,400	23,020	11,670	2,640	2,000	2,320
13.....	5,430	4,450	5,430	1,700	2,160	2,160	23,330	18,770	5,090	2,640	2,000	2,320
14.....	4,360	4,450	4,900	1,700	2,480	2,480	19,390	13,940	4,720	2,640	2,320	2,320
15.....	4,360	5,430	6,360	1,550	1,700	2,320	11,670	11,110	4,520	7,070	1,775	2,320
16.....	4,360	5,430	7,415	1,550	1,700	2,480	13,070	8,660	4,180	6,450	1,700	2,320
17.....	4,360	5,780	7,730	1,700	1,700	2,480	12,230	6,740	4,000	6,310	1,700	2,160
18.....	6,205	5,780	8,070	1,700	1,700	1,850	12,230	8,660	4,000	4,810	1,700	2,160
19.....	7,950	5,680	8,070	1,550	1,550	1,700	19,390	18,460	3,820	3,470	1,700	2,160
20.....	8,300	7,810	9,415	1,550	1,550	1,700	18,460	11,670	4,270	3,470	1,700	2,160
21.....	8,780	8,070	9,420	1,400	1,700	1,700	18,460	10,090	4,270	5,185	1,700	2,160
22.....	8,540	7,180	9,895	1,400	1,550	2,320	13,070	9,270	4,360	4,540	1,850	2,160
23.....	8,660	4,360	1,625	1,550	1,550	2,000	13,070	13,360	4,810	4,090	1,850	2,160
24.....	8,185	4,360	1,700	1,550	1,550	2,000	10,830	12,510	4,810	4,090	1,850	2,160
25.....	7,620	4,180	1,850	1,700	2,000	2,000	19,080	12,510	4,000	4,180	1,775	2,160
26.....	7,400	4,900	1,700	2,800	1,550	2,000	19,080	12,510	4,000	4,180	1,775	2,160
27.....	4,360	4,720	1,700	2,800	1,550	2,000	19,080	12,510	4,000	4,180	1,775	2,160
28.....	4,360	4,720	1,775	5,280	2,320	85,950	20,850	12,230	2,960	4,000	1,775	2,160
29.....	4,360	.....	1,700	3,130	2,000	85,950	17,840	12,230	2,960	4,000	1,775	2,160
30.....	4,360	.....	1,700	3,130	2,320	85,950	15,990	20,850	2,960	4,000	1,775	2,160
31.....	4,540	.....	.....	.....	2,320	85,950	15,990	20,850	2,960	4,000	1,775	2,160
Maximum.....	10,695	10,160	9,895	5,280	2,960	85,950	44,410	61,150	44,100	9,645	3,820	2,480
Minimum.....	4,360	4,180	1,625	1,260	1,400	1,550	5,890	6,100	2,960	2,560	1,700	2,160
Mean.....	6,982	5,963	5,564	1,852	1,918	5,572	17,795	14,316	12,554	4,041	2,137	2,738

Daily and monthly discharges, in liters per second, of Talisay River near Aningay, Pilar, Bataan, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1		2,160			1,550		2,640					
2		2,320			1,550	1,400	3,470					
3		2,320			1,550	1,450	5,280					
4		2,320				1,260	5,680					
5		2,320			1,550	1,260	4,000					
6		2,320			1,550	1,120						
7		2,320			1,550	1,260						
8		2,320		1,700	1,550		2,960					
9				1,700	1,550	5,680	2,960					
10		2,320		1,700	1,400	9,270	2,480					
11		2,320		1,550	1,400	4,540	2,480					
12		2,320		1,700		2,960	2,480					
13		2,320			1,400	2,480						
14	2,640	2,320		1,550	1,400		1,550					
15	2,640			1,550	1,400	4,720	1,550					
16	2,480			1,550	1,400	4,900	1,550					
17	2,480			1,400	1,400	4,180	1,550					
18	2,480			1,550		3,820	1,550					
19	2,480				2,000	3,640						
20	2,480			1,550	1,550	3,470						
21	2,480			1,550	1,260		2,800					
22	2,480			1,550	1,260	2,800	2,800					
23	2,480			1,550	1,260	2,800	2,800					
24	2,480			1,700		2,800	2,800					
25				1,550	1,550	2,800	2,800					
26					1,400	2,800	2,800					
27	2,480			1,700	1,550	2,800	2,800					
28	2,480				1,550	2,800	2,800					
29	2,480			1,550	1,400	2,640	2,800					
30	2,320			1,550	1,550	2,480						
31	2,320				1,400							
Maximum	2,640	2,320		1,700	2,000	9,270	5,680					
Minimum	2,320	2,160		1,586	1,260	1,120	1,550					
Mean	2,489	2,309			1,468	3,139	2,761					

## BATANGAS PROVINCE

### PANSIPIT RIVER, TAAL

LOCATION.—Just above bodega of Ignacio Ilagan and at the lower corner of the rice field abutting on the river.

RECORDS AVAILABLE.—Gage height records only from August 26, 1910, to August 31, 1911.

GAGE.—Standard metric gage vertically nailed to column of adobe wall at left bank of the river.

DISCHARGE MEASUREMENTS.—None taken during period of observation.

CHANNEL AND BANKS.—Channel straight for about 100 m. above and about 500 m. below the station. Right bank averages about one meter high above mean water level, and seldom overflows. Left bank high, rocky and well protected. Bed of stream of adobe, sand and hard clay and permanent.

EXTREMES OF STAGE.—Highest stage recorded during period of observation, 1.18 m. on August 21, 1911, lowest stage, 0.20 m. on August 28 and November 9, 1910.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—No daily discharge could be given as there was no gaging made on this river. Gage read twice daily.

Daily and monthly gage heights in meters, of Pansipit River near Taal, Batangas, for the year 1910

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.									61	58	28	36
2.									52	44	26	36
3.									54	40	28	36
4.									42	38	30	34
5.									37	38	28	28
6.									34	36	25	30
7.									34	34	24	30
8.									32	34	22	30
9.									30	35	20	32
10.									32	37	38	30
11.									30	39	34	29
12.									37	38	40	36
13.									44	44	32	40
14.									45	49	46	40
15.									48	48	35	43
16.									51	49	32	42
17.									51	41	44	32
18.									44	34	33	28
19.									34	28	28	26
20.									32	33	28	24
21.									26	26	36	23
22.									24	32	38	28
23.									27	30	46	31
24.									28	30	48	29
25.									30	38	45	33
26.									38	44	42	33
27.									56	56	38	31
28.									22	42	40	40
29.									60	60	40	40
30.									55	44	36	38
31.									58	25	36	38
Maximum								58	61	58	48	48
Minimum								34	20	24	25	23
Mean									41	38	34	33

Daily and monthly gage heights in meters, of Pansipit River near Taal, Batangas, for the year 1911

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.	32	26	30	26	.45	58	72	1 12				
2.	36	45	36	27	.48	59	.72	1 12				
3.	32	50	31	37	.50	59	.69	1 13				
4.	31	48	32	37	.51	64	70	1 12				
5.	30	53	33	34	.56	50	70	1 10				
6.	30	52	34	43	.53	46	.72	1 09				
7.	30	52	38	44	.53	47	71	1 08				
8.	33	59	44	43	.45	48	73	1 06				
9.	42	60	52	34	.43	48	76	1 06				
10.	34	63	50	30	.41	48	75	1 06				
11.	46	60	44	23	.42	51	74	1 06				
12.	46	46	30	22	.42	51	73	1 12				
13.	44	47	26	24	.44	51	73	1 12				
14.	34	46	24	24	.45	57	1 07	1 16				
15.	35	45	26	26	.47	52	1 04	1 16				
16.	28	42	28	26	.47	52	1 07	1 16				
17.	24	42	26	31	.49	65	1 06	1 16				
18.	24	42	30	36	.48	65	1 07	1 16				
19.	26	37	28	36	.49	65	1 07	1 17				
20.	26	37	28	36	.52	61	1 08	1 18				
21.	28	40	40	39	.50	61	1 08	1 17				
22.	32	47	31	39	.54	64	1 13	1 15				
23.	36	47	33	35	.46	64	1 13	1 13				
24.	36	44	35	49	.43	65	1 15	1 13				
25.	38	42	37	42	.42	65	1 15	1 13				
26.	38	38	39	39	.44	66	1 16	1 13				
27.	43	31	39	40	.44	70	1 16	1 13				
28.	39	32	23	40	.46	66	1 13	1 11				
29.	23	30	24	42	.50	69	1 14	1 10				
30.	..	..	24	42	.52	71	1 11	1 10				
31.	..	..	26	45	.52	..	1 11	1 10				
				58	58							
Maximum.	46	63	52	54	58	71	1 16	1 18				
Minimum.	23	26	23	22	41	46	.69	1 06				
Mean.	34	45	33	35	47	55	.94	1 12				

## BATANGAS PROVINCE

## TUBIG-NG-BAYAN IRRIGATION CANAL NO. 1, ROSARIO

LOCATION.—In the barrio of Old Rosario and about 97 km. from Manila.

RECORDS AVAILABLE.—From November 14 to December 31, 1922.

GAGE.—Metric gage board placed 1 m. above weir.

DISCHARGE MEASUREMENTS.—Made by sharp-crested weir with complete contractions.

CHANNEL AND BANKS.—Channel straight for 10 m. above and below weir. Both banks low, of steady earth and covered with vegetation. Bottom of canal of soft adobe stone.

EXTREMES OF DISCHARGE.—Maximum discharge during period of observation 446.8 second-liters on November 18, 1922; minimum discharge, 86. second-liters on November 14–15, 1922.

DIVERSIONS.—Canal diverts water from the Tubig-Ng-Bayan River.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Record fair. Gage read twice daily.



*Daily and monthly discharges, in liters per second, of Tubig-Ng-Bayan Canal near Sambat, Rosario, Batangas,  
for the year 1922*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	166.1
2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	161.9
3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	166.1
4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	166.1
5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	166.1
6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	168.1
7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	170.2
8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	166.1
9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	159.8
10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	166.1
11	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	164.0
12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	166.1
13	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	163.6
14	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	141.8
15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	86.1	151.8
16	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	86.1	161.9
17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	167.5
18	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	147.5
19	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	149.5
20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	196.2
21	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	202.9
22	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	181.0
23	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	147.5
24	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	168.1
25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	151.6
26	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	160.2
27	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	147.5
28	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	170.2
29	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	141.5
30	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	170.2
31	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	133.5
Maximum	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	170.2
Minimum	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	121.8
Mean	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	161.6

NOTE.—Discharge determined by formula,  $Q = 1838 (L-2H) H^{3/2}$ .

# BOHOL PROVINCE

## BAGO SECO RIVER, MABINI

LOCATION.—About 1 km. northwest of Batuanan on the Batuanan-Ubay trail.

RECORDS AVAILABLE.—From January 19 to July 18, 1922.

GAGE.—Standard metric gage board vertically nailed to the "Bitan-ag" tree on the right bank of the river. It reads from 50 cm. to 4 m.

DISCHARGE MEASUREMENTS.—Made by wading at ordinary stage and by float at extreme high water.

CHANNEL AND BANKS.—Channel straight 20 m. above and 50 m. below the station. Both banks low, clayey, and subject to overflow. Stream bed sandy and considerably shifting.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 27,541 second-liters on May 21, 1922; minimum discharge, 73 second-liters in April and May, 1922.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Rating curves are well defined for low and medium stages; records good. High-water extension of rating curve not based on measurements and determinations above 3,000 second-liters may be considerably in error. Gage read twice daily.

*Discharge measurements of Bago Seco River, near Batuanan, Mabini, Bohol*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1921</b>				
December 6. . . . .	W. Demers and A. Baldonado.	Investigation.	970	.....
<b>1922</b>				
January 19. . . . .	A. Baldonado . . . . .	1. 90	1,680	.....
March 2. . . . .	do . . . . .	1. 54	330	.....
April 6. . . . .	do . . . . .	1. 48	156	.....
May 7. . . . .	do . . . . .	1. 46	147	.....
June 30. . . . .	do . . . . .	1. 54	429	.....
September 8. . . . .	do . . . . .	3 31		.....

Daily and monthly discharges, in liters per second, of Bago Seco River near Batuanan, Mabini, Bohol, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.		1,118	381	282	73	190	610					
2.		3,261	330	190	73	147	460					
3.		1,576	330	190	73	235	282					
4.		2,027	282	190	128	190	190					
5.		1,905	282	190	109	355	147					
6.		1,788	282	190	109	190	212					
7.		2,589	282	190	109	147	9,553					
8.		1,826	282	190	109	109	10,569					
9.		1,427	282	190	90	109	1,905					
10.		1,458	282	258	90	90	920					
11.		774	381	190	73	90	489					
12.		774	489	190	90	90	579					
13.		739	355	190	73	90	548					
14.		739	282	190	73	90	1,202					
15.		674	1,035	190	73	90	{ 1,289 }					
16.		642	957	147	109	90	{ 23,860 }					
17.		579	610	147	73	90						
18.		579	548	212	73	147						
19.		1,905	548	212	73	147						
20.		7,461	548	147	489	235						
21.		1,576	355	147	27,541	{ 15,525 }						
22.		25,353	774	128	9,225	674						
23.		27,033	579	282	518	518						
24.		7,965	489	109	381	518						
25.		4,773	489	282	330	330						
26.		2,223	433	109	358	358						
27.		2,757	381	282	235	235						
28.		1,576	381	109	212	212						
29.		1,076	282	90	212	212						
30.		1,076	282	73	190	2,156						
31.		1,076	282	.....	190							
Maximum.	27,033	3,261	1,035	282	27,541	15,525	23,860					
Minimum.	706	381	282	73	73	90	147					
Mean.	6,575	1,046	375	165	1,338	571	2,339					

## BOHOL PROVINCE

## CABATANG RIVER, MABINI

LOCATION.—About 3 km. northwest of Batuanan-Sierra Bullones trail.

RECORDS AVAILABLE.—From January 18 to July 22, 1922.

GAGE.—Standard metric gage board vertically fastened to a tree on the left bank.

DISCHARGE MEASUREMENTS.—Made by wading at low and medium stages at about 10 m. below the gage.

CHANNELS AND BANKS.—One channel at all stages; straight about 30 m. above and 20 m. below station; both banks high and stony. Stream bed sandy, mixed with clay.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 42,100 second-liters on June 21 and July 10, 1922; minimum discharge, 5 second-liters on May 19, 1922.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge determined from fairly well-defined curve. Discharge over 6,000 second-liters considerably in error. Gage read twice daily.

*Discharge measurements of Cabatang River, near Batuanan, Mabini, Bohol*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1921</b>				
December 6 . . . . .	Demers and Baldonado . . .	Investi- gation.	1,380	.....
<b>1922</b>				
January 18 . . . . .	A. Baldonado . . . . .	3.16	4,430	.....
January 19 . . . . .	..do. ....	2.80	2,420	.....
March 2 . . . . .	..do. ....	2.32	281	.....
April 6 . . . . .	..do. ....	2.23	48	.....
May 7 . . . . .	..do. ....	2.18	51	.....
June 30 . . . . .	..do. ....	2.58	1,505	.....

Daily and monthly discharges, in liters per second, of Cabatang River near Batuanan, Mabini, Bohol, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	13,000	330	122	8	360	11,250						
2	3,550	282	108	8	238	4,290						
3	1,568	238	108	8	238	2,198						
4	6,792	198	70	52	198	1,078						
5	7,803	198	70	52	198	1,078						
6	2,900	198	70	52	198	582						
7	6,307	178	122	218	3,410	330						
8	3,216	158	70	108	738	420						
9	3,410	178	420	23	390	12,030						
10	2,600	238	330	14	158	42,100						
11	1,868	238	238	14	40	28,620						
12	1,501	238	122	14	198	12,615						
13	1,307	306	94	10	52	10,090						
14	1,123	330	94	10	29	5,172						
15	990	198	178	6	20	2,143						
16	904	158	178	6	14	1,402						
17	779	2,198	122	6	658	8,150						
18	5,720	1,078	122	6	658	4,910						
19	5,720	1,078	82	6	5,085	2,143						
20	8,826	582	82	282	4,274	2,631						
21	2,198	420	20	...	390	3,089						
22	13,000	990	17	3,410	18,335	1,307						
23	13,000	450	14	2,088	14,940	282						
24	9,508	282	14	1,260	698	...						
25	6,792	390	17	658	198	...						
26	3,690	330	14	450	450	...						
27	4,126	282	14	306	820	...						
28	2,308	306	12	218	658	...						
29	2,143	158	10	158	198	...						
30	...	122	10	122	9,994	...						
31	3,830	122	...	94	...	...						
Maximum	13,000	2,198	420	3,410	42,100	42,100						
Minimum	2,143	122	10	5	14	14						
Mean	5,514	351	94	320	2,830	8,320						

NOTE.—No record on May 21, 1922.

## BOHOL PROVINCE

## DIMIAO RIVER, BILAR

LOCATION.—At Km. 42 on the Loay interior provincial road of Bohol and 500 m. from the poblacion of Bilar toward Carmen.

RECORDS AVAILABLE.—From January 28, 1922, to March 31, 1922.

GAGE.—Standard metric gage board vertically fastened to one of the piers of the bridge at Bilar.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND BANKS.—One channel at all stages; both banks low and subject to overflow, stream bed rough and of limestone rock.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 8,064 second-liters on February 7, 1922; minimum discharge, 758 second-liters on February 27 and March 4-8, and 24-31, 1922.

DIVERSIONS.—Part of flow diverted to rice land.

REGULATION.—By diversion.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Gage read twice daily. Discharge determined from fairly well-defined rating curve. Records fair below 4,000 second-liters. Brush dams above station slightly affect measurements.

*Discharge measurements of Dimiao River, near Poblacion, Bilar, Bohol*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1922</b>				
January 29..	A. Baldonado . .	1 45	2,900	
March 6....	..do ..	1 30	770	
April 4....	..do ..	1 27	650	
May 4....	..do ..	1 26	622	
June 27 ..	..do ..	1 32	1,206	



## BOHOL PROVINCE

## GABAYAN RIVER, CANDIJAY

**LOCATION.**—About 7 km. west of the old town of Candijay; a good trail leading to the station from Km. 47 at the Candijay-Batuanan provincial road.

**RECORDS AVAILABLE.**—From January 21, 1922, to July 24, 1922.

**GAGE.**—Standard metric gage board vertically fastened to a tree on the left bank.

**DISCHARGE MEASUREMENTS.**—Made by wading.

**CHANNEL AND BANKS.**—One channel at all stages: channel straight for 30 m. above and 20 m. below station; left bank high and of limestone; right bank low and clayey. Stream bed sandy and clayey.

**EXTREMES OF DISCHARGE.**—Maximum discharge recorded during period of observation, 66,195 second-liters on January 22, 1922; minimum discharge, 430 second-liters on June 14-15, 1922.

**DIVERSIONS.**—None.

**REGULATION.**—None.

**UTILIZATION.**—For irrigation purposes.

**ACCURACY.**—Rating curves fairly well defined for low and medium stages. Records below 6,000 second-liters, fair; gage read twice daily. During flood time station is inaccessible.

*Discharge measurements of Gabayan River, near Anuling, Candijay, Bohol*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1921</b>				
December 5.....	Demers and Baldonado...	Investigation.	1,160	.....
<b>1922</b>				
January 23.....	A. Baldonado .....	1.78	13,100	.....
March 3.....	do. ....	1.20	1,110	.....
April 6.....	do. ....	1.15	703	.....
May 7.....	do. ....	1.14	580	.....
June 30.....	do. ....	1.22	1,542	.....
September 7...	do. ....	1.22	1,310	.....



Daily and monthly discharges, in liters per second, of Gabayan River near Anuling, Canditay, Bohol, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.	.....	9,905	1,220	1,110	580	1,220	5,270	.....	.....	.....	.....	.....
2.	.....	4,710	1,220	1,110	580	580	3,005	.....	.....	.....	.....	.....
3.	.....	3,655	1,110	1,110	580	910	3,160	.....	.....	.....	.....	.....
4.	.....	7,635	1,110	1,110	580	1,220	1,695	.....	.....	.....	.....	.....
5.	.....	5,080	1,110	910	580	740	1,110	.....	.....	.....	.....	.....
6.	.....	3,655	1,110	740	500	740	1,110	.....	.....	.....	.....	.....
7.	.....	5,470	1,110	580	580	910	1,110	.....	.....	.....	.....	.....
8.	.....	3,830	1,110	1,110	580	580	5,470	.....	.....	.....	.....	.....
9.	.....	3,485	1,220	1,110	660	910	5,080	.....	.....	.....	.....	.....
10.	.....	3,005	1,330	1,110	580	660	4,005	.....	.....	.....	.....	.....
11.	.....	2,395	1,110	1,110	580	580	4,180	.....	.....	.....	.....	.....
12.	.....	2,245	1,330	910	580	580	1,695	.....	.....	.....	.....	.....
13.	.....	2,245	2,245	910	500	580	1,330	.....	.....	.....	.....	.....
14.	.....	2,100	1,825	910	500	430	2,100	.....	.....	.....	.....	.....
15.	.....	1,825	1,330	1,110	580	430	1,110	.....	.....	.....	.....	.....
16.	.....	1,825	2,695	1,010	500	910	2,100	.....	.....	.....	.....	.....
17.	.....	1,570	3,320	910	580	740	4,005	.....	.....	.....	.....	.....
18.	.....	1,570	1,695	910	580	1,330	5,270	.....	.....	.....	.....	.....
19.	.....	1,570	2,100	740	580	1,570	4,895	.....	.....	.....	.....	.....
20.	.....	2,100	1,450	740	820	2,850	4,385	.....	.....	.....	.....	.....
21.	27,585	2,100	1,220	740	740	1,450	4,005	.....	.....	.....	.....	.....
22.	66,195	2,395	1,110	660	660	2,100	1,695	.....	.....	.....	.....	.....
23.	16,665	1,695	1,110	660	660	2,100	1,110	.....	.....	.....	.....	.....
24.	8,120	1,695	1,110	660	580	1,330	1,110	.....	.....	.....	.....	.....
25.	5,870	1,570	1,110	820	740	910	.....	.....	.....	.....	.....	.....
26.	4,710	1,330	1,110	740	1,110	910	.....	.....	.....	.....	.....	.....
27.	4,355	1,330	1,110	740	1,110	740	.....	.....	.....	.....	.....	.....
28.	3,655	1,330	1,110	740	1,110	660	.....	.....	.....	.....	.....	.....
29.	3,655	.....	1,110	580	1,110	660	.....	.....	.....	.....	.....	.....
30.	3,320	.....	1,110	580	1,330	1,825	.....	.....	.....	.....	.....	.....
31.	5,870	.....	1,110	.....	1,330	.....	.....	.....	.....	.....	.....	.....
Maximum.	66,195	9,905	3,320	1,110	1,330	2,850	5,470	.....	.....	.....	.....	.....
Minimum.	3,320	2,395	1,110	580	500	430	1,110	.....	.....	.....	.....	.....
Mean.	13,636	2,973	1,389	873	712	1,013	2,957	.....	.....	.....	.....	.....

## BOHOL PROVINCE

## LOBOC RIVER, CARMEN

**LOCATION.**—About 2½ km. northeast of Carmen and about 300 m. upstream from the crossing of Carmen Colony road.

**RECORDS AVAILABLE.**—From January 26, 1922, to July 15, 1922.

**GAGE.**—Standard metric gage board vertically fastened to “dapdap” tree on the left bank of the river.

**DISCHARGE MEASUREMENTS.**—Made by wading at low and medium stages at 20 m. below the gage; by float during high water.

**CHANNEL AND BANKS.**—One channel at all stages; straight for about 30 m. above and 80 m. below the station. Both banks low, sloping gradually. Stream bed clayey and rocky; easily scoured.

**EXTREMES OF DISCHARGE.**—Maximum discharge during period of observation, 27,820 second-liters on May 21, 1922; minimum discharge, 20 second-liters on April 25–30, May 1 and 19, 1922.

**DIVERSIONS.**—None.

**REGULATION.**—None.

**UTILIZATION.**—For irrigation purposes.

**ACCURACY.**—Records fair below 6,960 second-liters. Gage read twice daily.

*Discharge measurements of Loboc River, near Poblacion, Carmen, Bohol*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1922</b>				
January 26.....	A. Baldonado . . .	1 56	4,100	.....
January 27.....	do.....	1 61	5,590	.....
March 5.....	do.....	1 12	310	.....
April 4.....	do.....	1 10	209	.....
May 4.....	do.....	1 11	254	.....
June 26.....	do.....	1 33	2,390	.....

Daily and monthly discharges, in liters per second, of Loboc River near Poblacion, Carmen, Bohol, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1		13,520	566	210	20	2,336	8,720					
2		4,900	310	210	636	1,228	2,610					
3		3,020	310	210	310	1,138	2,018					
4		5,445	310	210	310	2,018	1,314					
5		5,035	310	30	872	1,510	1,048					
6		10,480	310	30	872	1,228	872					
7		15,720	256	30	426	872	426					
8		4,900	256	30	426	356	426					
9		3,610	256	426	1,138	356	2,018					
10		2,676	310	426	1,138	310	20,080					
11		1,914	960	364	872	6,325	20,080					
12		1,914	1,914	364	872	3,610	2,904					
13		1,810	1,138	256	256	1,510	4,240					
14		1,810	872	256	210	1,228	2,018					
15		1,225	872	426	210	1,048	1,510					
16		1,048	5,035	364	210	1,048						
17		1,048	3,376	256	30	426						
18		1,048	2,448	210	30	1,228						
19		960	4,240	210	30	1,228						
20		872	1,810	210	20	1,510						
21		1,510	1,510	100	1,810	1,138						
22		1,048	1	27,820	<sup>a</sup> 27,820	7,920						
23		960	872	30	3,136	3,136						
24		872	712	30	2,018	1,048						
25		426	636	20	1,228	15,920						
26	4,900	364	426	20	1,048	2,018						
27	5,035	310	310	20	960	2,018						
28	3,136	636	310	20	636	1,510						
29	3,136		310	20	364	1,048						
30	3,020		256	20	872	872						
31	12,880		256	20	1,112	2,562						
Maximum.	12,880	15,920	5,035	426	<sup>a</sup> 27,820	15,920	20,080					
Minimum.	3,020	310	256	170	20	310	426					
Mean.	5,351	3,329	1,032		2,071	2,235	3,708					

NOTE.—Discharge determined from fairly well-defined rating curve applicable throughout the period of observation.  
<sup>a</sup> Unreliable.

## BOHOL PROVINCE

## LOBOC RIVER, LOBOC

**LOCATION.**—Below the junction of the Camayugan Creek and Loboc River; a trail leading to the station from Km. 28.5 on the Loay-Loboc provincial road.

**RECORDS AVAILABLE.**—From January 29, 1922, to December 31, 1922.

**GAGE.**—Standard metric gage board inclinely fastened to a limestone on the left bank of the river.

**DISCHARGE MEASUREMENTS.**—Made by wading.

**CHANNEL AND BANKS.**—One channel at all stages; both banks high vertical wall of limestone; pond formed 10 m. above; channel straight for 30 m. below station. Rapids are formed about 35 m. below station.

**EXTREMES OF DISCHARGE.**—Maximum discharge recorded during period of observation, 182,870 second-liters on September 6, 1922; minimum discharge, 9,430 second-liters on April 22–25 and December 12, 1922.

**DIVERSIONS.**—None.

**REGULATION.**—None.

**UTILIZATION.**—For power and irrigation purposes.

**ACCURACY.**—Pond above and rapids below station affect measurements; rating curve fairly well defined; discharge greater than 38,500 second-liters considered inaccurate. Gage read twice daily.

*Discharge measurements of Loboc River, near Bagumbayan, Loboc, Bohol*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1922</b>				
March 6.....	A. Baldonado.	1.48	12,320	
April 3.....	do.....	1.45	10,900	
May 3.....	do.....	1.60	17,260	
September 11.....	do.....	1.61	21,080	
September 30.....	G. M. Borja.....	1.44	8,900	
October 23.....	do.....	1.64	21,902	
November 3.....	do.....	1.70	21,820	
November 13.....	do.....	1.74	26,660	
December 1.....	do.....	1.54	13,900	

Daily and monthly discharges, in liters per second, of Loboc River near Bagumbayan, Loboc, Bohol, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....		84 080	12 970	10 640	9 720	21 410	35 290	10 640	33 270	10 330	19 960	13 420
2.....		44 120	12 530	10 640	10 020	18 580	36 350	10 640	18 580	11 350	24 500	11 730
3.....		29 580	12 130	10 330	13 900	17 260	27 830	10 020	30 480	11 350	22 920	10 020
4.....		27 830	12 130	10 020	17 260	32 330	18 580	10 020	28 700	12 970	61 880	13 900
5.....		75 200	11 350	10 020	17 920	21 410	17 260	10 020	29 580	27 830	56 330	14 380
6.....		36 350	11 350	10 020	19 260	16 040	16 040	10 020	182 870	17 920	98 510	16 040
7.....		78 530	11 350	10 020	16 040	13 900	13 420	10 020	114 050	31 400	106 300	13 900
8.....		55 220	11 350	10 020	12 970	12 130	12 130	10 020	58 550	106 300	68 540	13 900
9.....		39 680	11 350	10 640	19 260	10 990	13 900	11 730	31 400	88 520	56 220	11 350
10.....		31 400	11 350	10 640	19 260	10 640	132 920	17 260	24 500	88 520	96 180	11 350
11.....		23 920	11 350	11 350	18 580	10 640	54 110	17 260	76 200	76 200	50 780	14 900
12.....		21 410	11 730	10 990	16 040	22 160	41 900	16 040	16 040	48 560	39 680	9 430
13.....		18 580	11 730	10 640	14 380	26 130	28 700	14 900	17 260	49 670	23 700	10 640
14.....		16 640	12 530	10 640	12 130	13 900	27 830	10 990	14 380	115 160	17 620	12 530
15.....		19 260	12 970	10 640	11 350	24 500	24 500	10 640	12 530	106 280	14 380	44 120
16.....		24 500	26 960	10 020	12 130	12 130	22 160	10 020	10 990	74 090	13 430	18 580
17.....		14 900	25 310	10 020	12 130	10 990	26 960	11 350	10 640	76 310	12 130	14 380
18.....		17 260	32 330	10 020	11 350	11 350	22 920	10 990	10 640	35 290	29 580	16 480
19.....		15 460	18 580	10 020	9 720	13 900	17 260	10 640	10 640	26 130	24 500	19 560
20.....		19 960	14 380	9 720	144 020	27 830	13 900	10 640	10 020	53 000	19 960	31 400
21.....		24 500	12 970	9 430	44 120	33 270	14 900	14 380	10 020	41 900	36 350	28 310
22.....		18 580	12 130	9 430	29 580	17 260	13 900	12 530	10 020	29 580	27 830	21 410
23.....		14 380	11 350	9 430	26 130	27 830	12 530	11 730	10 020	19 960	16 040	10 640
24.....		13 900	12 130	9 430	26 130	13 420	12 970	11 350	10 020	16 040	16 640	10 020
25.....		12 970	11 350	9 720	18 580	33 270	13 420	12 970	11 350	16 040	18 580	11 730
26.....		12 130	10 990	10 020	16 040	33 270	12 970	14 380	11 350	20 680	17 260	13 900
27.....		12 970	10 640	10 020	14 900	24 500	12 130	12 970	10 990	23 700	15 460	66 320
28.....		27 830	10 640	10 020	14 900	17 260	11 350	12 970	11 350	32 330	14 900	39 680
29.....		29 580	10 640	9 720	13 900	19 260	11 350	28 700	10 990	59 660	16 640	27 830
30.....		29 580	10 640	9 720	14 900	17 920	11 350	27 830	10 020	20 680	20 680	17 260
31.....		29 580	10 640	9 720	13 900	17 920	10 990	25 310	..	21 410	.....	19 260
Maximum	27 830	84 080	32 330	11 350	144 020	33 270	132 920	28 700	182 870	115 160	106 300	66 320
Minimum	27 830	12 130	10 640	9 430	9 720	10 640	10 990	10 020	10 020	10 330	12 130	9 430
Mean.....	28 997	29 227	13 605	10 133	25 891	18 373	24 038	13 523	31 096	44 393	35 193	18 863

# BULACAN PROVINCE

## ANGAT RIVER, NORZAGARAY

**LOCATION.**—About 2 km. east of Barrio Matictic and very near north of the barrio, Santo.

**RECORDS AVAILABLE.**—From August 9, 1918, to December 31, 1922. Also from April 3, 1909, to November 8, 1913, inclusive, at place very near the present station.

**GAGE.**—Inclined staff of two sections at left bank of river. First section reading from 0 to 2 m., and second section from 2 to 4.8 m.

**DISCHARGE MEASUREMENTS.**—Made from raft at low water; from cable at high water.

**CHANNEL AND BANKS.**—Channel is straight above, over 150 m. and below for 100 m.; right bank covered with gravel and fine sand, subject to scour; left bank high and rocky. Bed of measuring section permanent, regular in shape and fairly smooth. Flow undisturbed at low water stage, but at high water stage flow of tremendous velocity.

**EXTREMES OF DISCHARGE.**—Maximum discharge during period of observation, 2,203,000 second-liters on August 16, 1921, estimated from extension of discharge curve. Minimum discharge, 2,500 second-liters on May 19, 1919.

**DIVERSIONS.**—None.

**REGULATION.**—None.

**UTILIZATION.**—For irrigation purposes.

**ACCURACY.**—Daily discharges from April, 1909, to December, 1911, determined from a well-defined rating curve, between 12,500 and 33,400 second-liters; from January, 1912, to November, 1913, from a very well-defined curve between 5,000 and 246,000 second-liters; and from August, 1918, to December, 1922, from a poorly-defined curve from 5,000 to 930,000 second-liters. Above and below these limiting values, discharges are estimated from extension of rating curve. Gage read twice daily.

### *Discharge measurements of Angat River, near Matictic, Norzagaray, Bulacan*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1909</b>				
April 3. ....	L. W. Abrons. ....	.40	36,150	.....
April 6. ....	do. ....	.36	29,362	.....
April 8. ....	do. ....	.35	24,603	.....
April 10. ....	do. ....	.35	19,890	.....
April 10. ....	do. ....	.30	22,180	.....
April 15. ....	do. ....	.28	19,080	.....
April 24. ....	do. ....	.20	11,986	.....
April 26. ....	do. ....	.19	11,570	.....
May 8. ....	do. ....	.21	12,590	.....
May 15. ....	do. ....	.27	16,360	.....
May 22. ....	do. ....	.12	9,560	.....
May 29. ....	do. ....	.19	12,370	.....
June 5. ....	do. ....	.20	13,270	.....
June 12. ....	do. ....	.14	9,285	.....
June 19. ....	do. ....	.39	21,102	.....
June 6. ....	do. ....	.33	16,688	.....
July 8. ....	do. ....	.44	23,180	.....
July 10. ....	do. ....	.69	38,975	.....
July 17. ....	do. ....	1.41	132,550	.....
July 24. ....	do. ....	.85	81,673	.....

*Discharge measurements of Angat River, near Matictic, Norzagaray,  
Bulacan—Continued*

Date	Made by—	Gage height (meters)	Discharge (second- liters)	Remarks
<b>1909</b>				
July 27.....	F. T. Ryan.....	2.37	435,997	
July 29.....	do.....	5.22	1,172,280	
August 9.....	do.....	1.78	59,735	
August 18.....	do.....	1.59	38,098	
August 27.....	do.....	1.11	26,335	
September 4.....	do.....	1.40	47,946	
September 7.....	do.....	1.14	30,984	
September 9.....	do.....	1.40	53,136	
September 10.....	do.....	1.54	67,812	
September 20.....	do.....	3.37	426,407	
September 27.....	do.....	1.64	81,422	
October 4.....	do.....	1.35	49,867	
October 11.....	do.....	1.28	42,958	
October 30.....	do.....	2.58	199,644	
November 2.....	do.....	2.23	129,399	
November 7.....	do.....	6.27	1,816,332	
November 8.....	do.....	4.89	897,788	
November 14.....	do.....	1.94	84,447	
November 22.....	do.....	1.44	59,543	
November 29.....	do.....	2.40	210,311	
December 7.....	do.....	1.61	85,804	
December 13.....	do.....	2.05	168,786	
December 20.....	do.....	2.02	161,388	
December 27.....	do.....	1.65	106,631	
<b>1910</b>				
January 4.....	do.....	2.35	231,601	
February 24.....	do.....	1.35	38,690	
March 8.....	do.....	1.03	15,842	
March 15.....	do.....	1.15	25,567	
March 28.....	do.....	1.19	25,212	
April 5.....	do.....	1.22	28,641	
April 11.....	do.....	1.06	15,046	
April 21.....	do.....	1.00	12,960	
May 10.....	do.....	1.08	13,542	
May 18.....	do.....	1.06	14,709	
June 16.....	do.....	1.28	27,765	
June 29.....	do.....	1.79	78,516	
July 18.....	do.....	1.60	60,904	
July 28.....	do.....	1.20	22,674	
August 5.....	do.....	1.55	58,467	
October 10.....	do.....	1.86	85,670	
October 15.....	do.....	1.90	121,460	
October 21.....	do.....	1.77	76,454	
October 25.....	do.....	1.73	75,529	
November 19.....	do.....	3.28	334,549	
November 25.....	do.....	2.70	208,590	
December 16.....	do.....	3.12	290,066	
December 16.....	do.....	1.90	89,563	
December 29.....	do.....	2.70	208,590	
<b>1911</b>				
January 9.....	J. A. Steere.....	1.64	53,429	
January 16.....	do.....	1.75	60,210	
January 23.....	do.....	1.38	26,728	
February 8.....	do.....	1.86	81,910	
February 16.....	do.....	1.55	43,531	
February 23.....	do.....	1.29	23,655	
March 8.....	do.....	1.22	19,156	
March 17.....	do.....	1.17	17,853	
March 25.....	do.....	1.26	22,836	
April 18.....	do.....	1.34	26,121	
May 6.....	do.....	1.56	47,237	
June 12.....	do.....	1.58	48,636	
August 6.....	do.....	2.84	306,127	
August 18.....	do.....	2.21	127,281	
August 22.....	do.....	1.84	75,680	
September 6.....	do.....	1.43	48,674	
September 18.....	do.....	1.32	26,450	
September 30.....	do.....	3.11	431,754	
October 17.....	do.....	1.61	47,407	
November 14.....	do.....	1.22	22,230	
December 9.....	do.....	1.14	14,369	
December 20.....	do.....	1.30	28,903	

*Discharge measurements of Angat River, near Matictic, Norzagaray,  
Bulacan—Continued*

Date	Made by—	Gage height (meters)	Discharge (second- liters)	Remarks
<b>1912</b>				
January 3.	W. G. Friable	1.21	20,456	
February 2.	do.	1.22	20,131	
February 2.	do.	1.21	19,854	
February 5.	do.	1.83	79,147	
February 17.	do.	1.17	19,291	
February 22.	do.	1.68	60,002	
February 23.	do.	1.46	35,938	
February 29.	do.	1.17	15,414	
March 7.	do.	1.11	13,084	
March 8.	do.	1.10	11,340	
March 8.	do.	1.10	10,918	
March 20.	do.	1.42	29,515	
March 25.	do.	1.10	11,027	
March 25.	do.	1.10	13,060	
April 1.	do.	1.21	19,105	
April 1.	do.	1.19	14,645	
April 2.	do.	1.14	13,114	
April 15.	do.	1.28	20,039	
April 15.	do.	1.29	20,081	
April 16.	do.	1.26	19,502	
April 25.	do.	1.07	10,837	
April 25.	do.	1.06	9,242	
April 26.	do.	1.06	9,230	
April 26.	do.	1.08	10,892	
April 26.	do.	1.05	8,901	
May 7.	do.	1.01	6,994	
May 7.	do.	1.01	7,389	
May 14.	do.	.99	6,090	
May 14.	do.	.99	5,650	
May 18.	do.	.96	5,220	
May 18.	do.	.96	5,080	
May 19.	do.	.97	5,510	
May 19.	do.	.97	5,680	
May 20.	do.	.96	5,600	
May 20.	do.	.98	6,460	
May 21.	do.	.99	6,310	
May 21.	do.	.99	5,690	
May 29.	do.	1.44	26,450	
May 30.	do.	1.36	27,360	
May 30.	do.	1.31	23,390	
May 30.	do.	1.44	30,700	
June 6.	do.	1.46	31,640	
June 6.	do.	1.48	33,420	
June 7.	do.	1.37	21,690	
June 7.	do.	1.05	8,720	
June 18.	do.	1.19	14,540	
June 19.	do.	1.28	20,070	
June 19.	do.	1.15	13,590	
June 20.	do.	1.00	6,840	
June 27.	do.	1.01	7,110	
June 27.	do.	1.02	7,950	
June 28.	do.	1.25	19,040	
July 11.	do.	1.26	19,540	
July 12.	do.	1.25	19,100	
July 12.	do.	1.64	43,550	
July 25.	do.	1.63	46,920	
July 26.	do.	1.59	42,410	
July 26.	do.	3.06	246,750	
August 3.	do.	3.01	238,280	
August 3.	do.	2.03	83,090	
August 9.	do.	2.40	173,980	
August 9.	do.	2.04	88,850	
August 10.	do.	2.01	81,190	
August 16.	do.	1.87	63,700	
August 17.	do.	2.09	92,520	
August 17.	do.	2.02	87,830	
August 23.	do.	1.69	47,068	
August 23.	do.	1.68	45,970	
August 24.	do.	1.90	56,950	
August 24.	do.	1.88	68,820	
September 3.	do.	2.21	97,800	
September 3.	do.	2.20	109,600	
September 4.	do.	2.14	101,900	
September 4.	do.	2.15	93,200	
September 16.	do.	1.82	62,800	



*Discharge measurements of Angat River, near Matictic, Norzagaray,  
Bulacan—Continued*

Date	Made by—	Gage height (meters)	Discharge (second- liters)	Remarks
<b>1912</b>				
September 16.	W. G. Frisbie.	1 83	64,100	
September 17.	do.	1.78	60,000	
September 17.	do.	1.78	60,700	
September 27.	do.	1 73	54,600	
September 27.	do.	1.71	53,150	
September 28.	do.	2 48	162,850	
October 3.	do.	1 96	76,100	
October 3.	do.	1.97	79,300	
October 10.	do.	2 34	131,400	
October 10.	do.	2 27	129,500	
October 11.	do.	2 07	95,000	
October 22.	do.	2 53	158,200	
October 22.	do.	2 55	165,500	
October 23.	do.	2 61	175,300	
October 29.	do.	1 82	59,000	
October 29.	do.	1.82	57,400	
October 30.	do.	1.76	52,950	
November 6.	do.	1 80	56,700	
November 8.	do.	4 09	367,000	
November 21.	do.	1.98	70,000	
November 21.	do.	1 96	70,400	
November 22.	do.	1.83	59,300	
November 22.	do.	1 84	60,400	
December 3.	do.	2 03	83,800	
December 3.	do.	2 02	82,300	
December 4.	do.	1 95	77,400	
December 4.	do.	1 95	74,900	
December 9.	do.	1 68	39,100	
December 9.	do.	1 68	39,400	
December 10.	do.	1 84	54,200	
December 10.	do.	1 90	61,100	
December 18.	do.	1.75	44,800	
December 18.	do.	1.76	45,800	
<b>1913</b>				
January 16.	do.	1 70	45,400	
January 16.	do.	1.69	45,700	
January 17.	do.	1 66	40,100	
January 17.	do.	1 65	40,300	
January 27.	do.	1 75	18,900	
January 27.	do.	1 76	48,800	
January 28.	do.	1.73	48,100	
January 28.	do.	1.74	50,800	
February 6.	do.	1 62	38,800	
February 6.	do.	1 62	38,900	
February 19.	do.	1 44	24,800	
February 19.	do.	1 44	27,700	
February 19.	do.	1 43	28,300	
March 5.	do.	1.78	54,400	
March 5.	do.	1.77	50,500	
March 6.	do.	1.61	38,200	
March 6.	do.	1 62	37,100	
March 18.	do.	1 23	14,200	
March 18.	do.	1 22	13,400	
March 25.	do.	1 17	11,300	
March 25.	do.	1.17	11,700	
March 26.	do.	1 16	11,000	
April 3.	do.	1.15	10,400	
April 3.	do.	1.15	10,000	
April 16.	do.	1.70	48,300	
April 17.	do.	1.68	47,000	
July 28.	do.	1.92	68,200	
July 28.	do.	1 93	67,400	
August 11.	do.	2.11	91,600	
August 11.	do.	2 15	93,400	
August 12.	do.	2.46	148,500	
August 25.	do.	2.61	170,100	
August 26.	do.	2.41	143,500	
September 15.	do.	2.20	113,300	
September 15.	do.	2.20	112,500	
September 16.	do.	2.06	91,000	
October 24.	do.	1.49	31,000	
October 25.	do.	1.45	30,000	

*Discharge measurements of Angat River, near Matictic, Norzagaray,  
Bulacan—Continued*

Date	Made by—	Gage height (meters)	Discharge (second- liters)	Remarks
<b>1918</b>				
April 22. ....	N. Cortes. ....		10,000	
April 22. ....	do. ....		8,700	
August 8. ....	W. Demers. ....	1.15	54,210	
October 10. ....	A. Diaz. ....	1.19	40,912	
November 21. ....	do. ....	1.08	41,508	
December 19. ....	do. ....	1.06	28,927	
<b>1919</b>				
January 17. ....	do. ....	.86	25,755	
January 28. ....	do. ....	.66	13,060	
January 28. ....	do. ....	.66	13,487	
February 12. ....	do. ....	.62	10,506	
March 6. ....	J. S. Roxas. ....	.58	10,573	
March 27. ....	do. ....	.48	7,642	
April 27. ....	do. ....	.39	4,651	
April 28. ....	do. ....	.38	4,837	
June 9. ....	do. ....	.51	25,784	
August 21. ....	W. Demers. ....	3.52	538,333	
August 22. ....	do. ....	2.61	311,175	
August 22. ....	do. ....	2.36	248,565	
August 23. ....	do. ....	2.10	200,206	
August 23. ....	do. ....	2.04	186,858	
September 24. ....	J. S. Roxas. ....	1.11	32,674	
September 25. ....	do. ....	1.10	32,833	
October 24. ....	do. ....	1.23	46,788	
November 16. ....	do. ....	1.08	35,305	
November 17. ....	do. ....	1.06	34,223	
November 17. ....	do. ....	1.06	34,059	
December 27. ....	J. Gochoco and J. Roxas	1.34	60,490	
<b>1920</b>				
January 21. ....	J. S. Roxas. ....	1.42	75,581	
January 21. ....	do. ....	1.42	75,474	
February 7. ....	do. ....	.85	16,244	
February 26. ....	do. ....	1.27	59,935	
March 30. ....	do. ....	.82	14,642	
April 17. ....	do. ....	.73	11,378	
June 9. ....	do. ....	1.00	27,876	
June 9. ....	do. ....	1.45	75,034	
June 9. ....	do. ....	1.26	61,918	
June 10. ....	do. ....	1.14	39,813	
July 8. ....	do. ....	2.08	219,640	
July 15. ....	do. ....	2.04	217,910	
July 16. ....	do. ....	2.09	232,802	
August 7. ....	do. ....	2.24	220,832	
September 3. ....	do. ....	1.56	92,646	
September 3. ....	do. ....	1.71	127,670	
September 17. ....	do. ....	1.03	30,798	
September 17. ....	do. ....	1.10	35,551	
September 18. ....	do. ....	1.08	32,042	
November 30. ....	do. ....	1.44	75,805	
November 30. ....	do. ....	1.44	76,347	
December 8. ....	do. ....	2.12	191,167	
<b>1921</b>				
February 5. ....	do. ....	1.32	57,934	
March 9. ....	do. ....	2.48	315,165	
May 20. ....	do. ....	.70	10,465	
June 25. ....	do. ....	1.14	27,293	
July 22. ....	do. ....	2.00	155,052	
August 23. ....	do. ....	.75	12,191	
September 8. ....	do. ....	1.40	51,332	
September 9. ....	do. ....	1.95	129,513	
October 17. ....	do. ....	1.03	25,382	
October 17. ....	do. ....	1.03	26,053	
November 17. ....	do. ....	1.73	124,009	
November 17. ....	do. ....	1.91	151,987	
November 18. ....	do. ....	1.60	92,079	
November 19. ....	do. ....	1.47	74,440	

*Discharge measurements of Angat River, near Matictic, Norzagaray,  
Bulacan—Continued*

Date	Made by—	Gage height (meters)	Discharge (second liters)	Remarks
<b>1922</b>				
January 20.....	J. S. Roxas.....	1 04	27,639	
January 20.....	do.....	1.04	27,003	
February 17.....	W. Demers.....	.91	18,497	
March 22.....	Julian Roxas.....	.81	11,859	
March 22.....	do.....	.81	11,092	
April 6.....	do.....	.81	10,637	
April 7.....	do.....	.80	9,980	
May 31.....	do.....	.86	13,995	
May 31.....	do.....	.86	12,500	
June 4.....	do.....	.90	18,347	
June 4.....	do.....	.90	19,926	
July 15.....	do.....	1.44	71,863	
July 15.....	do.....	1.44	76,105	
August 17.....	do.....	1.19	42,137	
August 17.....	do.....	1.19	46,348	
September 14.....	do.....	1.50	79,266	
September 15.....	do.....	1.32	56,024	
September 16.....	do.....	1.45	72,114	
October 13.....	do.....	1.59	116,904	
October 14.....	do.....	1.41	89,371	
October 14.....	do.....	1.45	80,948	
December 15.....	do.....	1.45	90,018	
December 16.....	do.....	1.41	84,317	
December 17.....	do.....	1.49	99,847	

NOTE.—Gage heights from April 22, 1918, referred to different datum.

Daily and monthly discharges, in liters per second, of Angat River near Matetic, Norzagaray, Bulacan, for the year 1909

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....					13,000	12,500	14,500	150,000	57,500	75,000	162,000	174,000
2.....					12,000	11,000	14,500	122,000	45,000	55,000	130,000	158,000
3.....				36,100	15,500	8,000	23,200	92,000	69,000	50,000	65,000	145,000
4.....					15,000	8,000	21,000	91,000	47,000	53,000	95,000	121,000
5.....					14,500	13,100	20,000	97,000	41,000	60,000	91,000	110,000
6.....				29,400	14,000	14,000	16,500	94,000	34,000	66,000	97,000	95,000
7.....					13,000	31,000	22,000	98,000	44,000	56,000	678,000	85,000
8.....				24,600	12,600	24,000	29,500	74,000	33,000	56,000	694,000	92,000
9.....					13,000	11,000	34,000	59,000	53,000	53,000	275,000	77,000
10.....				22,000	12,500	9,000	39,000	50,000	50,000	48,000	180,000	56,000
11.....					12,000	8,600	25,000	47,000	47,500	42,000	140,000	275,000
12.....					13,000	9,230	18,000	40,000	42,000	64,000	124,000	122,000
13.....					14,000	8,000	14,000	36,000	64,000	66,000	97,000	148,000
14.....					13,600	8,000	22,000	36,000	46,000	52,000	82,000	171,000
15.....				19,100	16,400	9,000	23,000	39,000	40,000	39,000	375,000	380,000
16.....				22,000	13,000	10,500	33,500	31,000	63,000	33,000	345,000	180,000
17.....					12,500	11,000	132,000	32,500	65,000	33,000	143,000	123,000
18.....				19,000	32,000	21,200	71,000	33,000	177,000	137,000	140,000	300,000
19.....					17,000	15,000	32,000	41,000	468,000	82,000	95,000	315,000
20.....				18,000	14,500	16,000	34,000	32,500	425,000	66,000	78,000	161,000
21.....				15,000	11,000	14,500	23,000	42,500	233,000	58,000	69,000	127,000
22.....				14,500	9,560	14,000	22,000	21,000	133,000	44,000	52,000	105,000
23.....					8,500	12,000	36,000	20,000	83,000	50,000	59,000	71,000
24.....				11,800	8,200	28,500	81,700	18,500	93,000	2,142,000	46,000	73,000
25.....				11,600	8,000	14,500	50,000	23,000	103,000	465,000	52,000	102,000
26.....					9,200	16,800	70,000	20,500	79,000	202,000	238,000	98,000
27.....				13,200	7,600	16,000	436,000	30,000	75,000	173,000	96,000	94,000
28.....				13,200	13,000	16,000	390,000	45,000	87,000	225,000	270,000	85,000
29.....				13,000	12,400	15,000	1,172,000	76,000	61,000	368,000	272,000	174,000
30.....				12,400	8,000	14,500	600,000	73,000	46,000	185,000	350,000	129,000
31.....					11,000	.....	210,000	83,000	.....	155,000	.....	143,000
Maximum .....				36,100	32,000	31,000	1,172,000	150,000	468,000	2,142,000	694,000	380,000
Minimum .....				11,600	7,500	8,000	14,000	18,500	33,000	33,000	46,000	56,000
Mean.....				17,905	12,800	13,999	118,000	56,800	96,700	170,194	181,000	144,300

Daily and monthly discharges, in liters per second, of Angat River near Matetic, Norzagaray, Bulacan, for the year 1910

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	125,000	86,000	33,000	40,000	20,000	58,000	115,000	37,000	135,000	121,000	167,000	98,000
2	94,000	85,000	23,000	29,000	18,000	55,000	225,000	47,000	60,000	95,000	325,000	171,000
3	98,000	75,000	17,000	25,000	15,000	57,000	147,000	58,000	80,000	98,000	500,000	420,000
4	275,000	135,000	19,000	25,000	14,000	38,000	87,000	42,000	138,000	86,000	608,000	450,000
5	300,000	103,000	15,000	27,000	13,500	34,000	74,000	77,000	194,000	68,000	275,000	279,000
6	155,000	125,000	24,000	26,000	14,000	30,000	100,000	52,000	213,000	100,000	192,000	205,000
7	112,000	118,000	26,000	24,000	33,000	27,000	100,000	43,000	120,000	82,000	132,000	132,000
8	88,000	108,000	16,000	26,000	15,000	25,000	61,000	39,000	126,000	51,000	137,000	138,000
9	115,000	95,000	32,000	22,000	13,500	24,000	61,000	39,000	120,000	51,000	137,000	138,000
10	113,000	52,000	32,000	19,000	12,000	22,000	61,000	60,000	120,000	48,000	137,000	103,000
11	73,000	137,000	14,000	15,000	13,000	22,000	61,000	60,000	95,000	56,000	137,000	103,000
12	63,000	113,000	11,000	12,000	12,000	31,000	61,000	43,000	75,000	517,000	98,000	72,000
13	50,000	95,000	11,000	12,000	12,000	38,000	61,000	43,000	65,000	157,000	74,000	65,000
14	40,000	78,000	25,000	11,000	11,500	32,000	61,000	43,000	55,000	111,000	67,000	69,000
15	82,000	91,000	24,000	10,500	27,500	33,000	61,000	38,000	82,000	125,000	400,000	108,000
16	118,000	96,000	17,000	9,500	19,000	27,000	61,000	38,000	76,000	127,000	410,000	106,000
17	95,000	100,000	16,000	10,000	16,000	29,000	43,000	43,000	330,000	130,000	186,000	88,000
18	100,000	75,000	15,000	8,500	14,000	30,000	56,000	44,000	133,000	360,000	140,000	135,000
19	100,000	155,000	16,000	9,000	18,500	60,000	44,000	38,000	192,000	205,000	560,000	110,000
20	82,000	112,000	22,000	9,000	15,000	72,000	38,000	33,000	167,000	136,000	375,000	83,000
21	100,000	78,000	13,000	9,000	18,000	56,000	40,000	30,000	30,000	76,000	420,000	58,000
22	78,000	55,000	13,000	7,500	23,000	50,000	35,000	32,000	340,000	76,000	644,000	52,000
23	62,000	34,000	16,000	222,000	24,000	40,000	39,000	32,000	198,000	81,000	325,000	48,000
24	48,000	35,000	17,000	188,000	42,000	49,000	35,000	185,000	141,000	83,000	600,000	64,000
25	116,000	25,000	33,000	74,000	145,000	73,000	31,000	198,000	133,000	76,000	245,000	49,000
26	94,000	71,000	32,000	46,000	47,000	83,000	26,000	96,000	133,000	72,000	160,000	53,000
27	116,000	52,000	28,000	34,000	112,000	94,000	26,000	70,000	119,000	72,000	135,000	96,000
28	69,000	57,000	25,000	26,000	160,000	78,000	30,000	58,000	164,000	69,000	123,000	478,000
29	57,000	87,400	30,000	22,000	67,000	95,000	31,000	47,000	181,000	58,000	102,000	224,000
30	83,000	155,000	57,000	22,000	148,000	95,000	39,000	48,000	164,000	53,000	120,000	140,000
31	300,000	155,000	57,000	222,000	150,000	95,000	225,000	198,000	340,000	517,000	644,000	478,000
Maximum.	400,000	25,000	7,500	7,500	17,500	22,000	25,000	30,000	55,000	48,000	67,000	48,000
Minimum	102,500	87,400	22,500	83,500	37,000	48,400	61,500	57,400	144,500	112,300	266,000	149,000
Mean.												

*Daily and monthly discharges, in liters per second, of Angat River near Matictic, Norzagaray, Bulacan, for the year 1911*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	76,000	26,000	18,000	31,000	26,000	36,000	46,000	280,000	108,000	268,000	26,000	20,000
2.....	59,000	26,000	18,000	28,000	26,000	53,000	636,000	514,000	85,000	152,000	26,000	19,000
3.....	50,000	26,000	26,000	34,000	26,000	33,000	105,000	452,000	68,000	116,000	27,000	18,000
4.....	45,000	23,000	31,000	38,000	27,000	28,000	37,000	300,000	56,000	88,000	30,000	17,000
5.....	46,000	34,000	35,000	42,000	130,000	25,000	76,000	204,000	48,000	81,000	25,000	18,000
6.....	46,000	103,000	24,000	28,000	45,000	31,000	57,000	174,000	43,000	64,000	22,000	18,000
7.....	52,000	117,000	21,000	27,000	35,000	35,000	49,000	144,000	40,000	68,000	20,000	18,000
8.....	75,000	91,000	20,000	26,000	30,000	37,000	44,000	154,000	38,000	64,000	20,000	17,000
9.....	58,000	68,000	18,000	22,000	30,000	28,000	40,000	170,000	36,000	64,000	20,000	20,000
10.....	43,000	62,000	16,000	30,000	56,000	51,000	44,000	120,000	38,000	64,000	19,000	18,000
11.....	37,000	41,000	15,000	26,000	42,000	37,000	49,000	116,000	35,000	64,000	20,000	16,000
12.....	36,000	325,000	23,000	25,000	29,000	53,000	67,000	315,000	40,000	64,000	19,000	19,000
13.....	41,000	124,000	22,000	19,000	29,000	36,000	376,000	400,000	31,000	64,000	22,000	17,000
14.....	40,000	80,000	29,000	18,000	26,000	37,000	746,000	220,000	28,000	46,000	20,000	20,000
15.....	38,000	62,000	19,000	21,000	25,000	32,000	1,090,000	190,000	27,000	62,000	17,000	16,000
16.....	40,000	45,000	17,000	19,000	24,000	31,000	898,000	150,000	35,000	50,000	17,000	17,000
17.....	34,000	39,000	16,000	17,000	28,000	28,000	793,000	110,000	28,000	58,000	77,000	52,000
18.....	26,000	34,000	16,000	24,000	27,000	27,000	430,000	100,000	30,000	208,000	76,000	41,000
19.....	27,000	33,000	15,000	20,000	23,000	28,000	235,000	82,000	30,000	92,000	64,000	30,000
20.....	24,000	27,000	33,000	22,000	22,000	27,000	225,000	85,000	98,000	98,000	49,000	25,000
21.....	24,000	27,000	46,000	18,000	40,000	28,000	371,000	75,000	98,000	52,000	34,000	27,000
22.....	27,000	23,000	31,000	24,000	40,000	26,000	395,000	64,000	102,000	52,000	34,000	27,000
23.....	27,000	23,000	25,000	46,000	27,000	24,000	1,418,000	60,000	126,000	39,000	32,000	46,000
24.....	25,000	23,000	22,000	108,000	23,000	22,000	1,268,000	63,000	100,000	34,000	30,000	30,000
25.....	36,000	21,000	23,000	55,000	21,000	29,000	1,198,000	61,000	55,000	39,000	30,000	28,000
26.....	73,000	21,000	116,000	43,000	45,000	22,000	1,268,000	63,000	55,000	37,000	25,000	30,000
27.....	35,000	20,000	43,000	36,000	45,000	20,000	888,000	66,000	60,000	37,000	23,000	29,000
28.....	48,000	18,000	90,000	40,000	49,000	34,000	235,000	70,000	160,000	32,000	22,000	28,000
29.....	31,000	.....	68,000	31,000	30,000	33,000	203,000	78,000	316,000	31,000	20,000	25,000
30.....	28,000	.....	47,000	28,000	30,000	35,000	176,000	146,000	380,000	29,000	21,000	26,000
31.....	26,000	.....	35,000	.....	42,000	.....	168,000	130,000	.....	26,000	.....	22,000
Maximum.....	76,000	325,000	116,000	103,000	130,000	53,000	1,418,000	514,000	380,000	268,000	112,000	52,000
Minimum.....	21,000	18,000	15,000	17,000	21,000	20,000	37,000	60,000	27,000	26,000	16,000	16,000
Mean.....	40,860	55,460	31,550	31,160	35,420	32,200	400,200	172,300	79,700	71,700	32,760	24,500

Daily and monthly discharges, in liters per second, of Angat River near Matictic, Norzagaray, Bulacan, for the year 1912

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	23,000	30,000	15,500	21,400	8,500	22,500	106,000	1,030,000	254,000	144,000	52,000	170,000
2.....	20,800	25,400	15,000	12,000	8,500	20,000	130,000	630,000	140,000	73,000	50,000	116,000
3.....	19,800	20,500	15,000	11,000	8,200	11,800	110,000	286,000	87,000	63,000	56,000	86,000
4.....	19,800	23,000	21,000	10,000	8,500	10,000	114,000	160,000	95,000	84,000	78,000	73,000
5.....	88,000	50,000	16,800	13,000	8,200	20,000	122,000	94,000	80,000	86,000	77,000	61,000
6.....	62,000	38,000	16,000	11,400	7,800	40,000	68,000	52,000	70,000	70,000	56,000	50,000
7.....	43,000	37,000	12,000	11,000	14,200	25,000	22,000	78,000	63,000	75,000	1,300,000	43,000
8.....	56,000	37,000	11,000	9,000	16,000	18,000	19,000	63,000	120,000	74,000	350,000	40,000
9.....	32,500	35,000	11,200	10,200	16,000	11,400	19,000	124,000	169,000	74,000	350,000	40,000
10.....	27,000	26,000	11,000	8,400	11,200	15,000	35,000	185,000	108,000	117,000	200,000	53,000
11.....	33,500	20,000	9,000	7,400	9,500	10,000	22,000	72,000	131,000	122,000	200,000	50,000
12.....	106,000	20,000	9,000	7,400	10,200	15,000	16,000	85,000	124,000	115,000	130,000	51,000
13.....	80,000	19,000	9,500	40,000	7,200	14,000	13,500	76,000	124,000	84,000	104,000	51,000
14.....	60,000	18,000	8,000	22,400	6,200	13,000	10,500	83,000	63,000	70,000	87,000	43,000
15.....	42,000	17,000	9,000	19,500	6,200	9,800	9,500	69,000	64,000	83,000	74,000	32,000
16.....	33,500	19,000	9,500	19,000	6,000	8,000	10,000	73,000	63,000	900,000	74,000	25,000
17.....	32,000	15,700	9,000	18,000	6,000	9,000	17,000	90,000	71,000	470,000	84,000	20,000
18.....	30,000	26,000	41,000	16,500	5,800	14,500	28,000	44,000	71,000	350,000	80,000	39,000
19.....	26,000	18,500	29,000	13,600	6,300	49,000	36,000	86,000	67,000	220,000	64,000	36,000
20.....	22,000	19,000	21,000	12,400	6,300	110,000	54,000	62,000	52,000	154,000	66,000	33,000
21.....	19,800	73,000	18,000	10,800	7,400	9,200	175,000	55,000	45,000	180,000	60,000	31,000
22.....	16,700	34,000	16,000	11,200	13,600	9,400	102,000	52,000	37,000	170,000	56,000	29,000
23.....	18,400	22,000	15,400	13,600	18,600	6,000	95,000	72,000	45,000	126,000	44,000	28,000
24.....	16,000	19,000	12,000	10,000	18,600	10,000	54,000	70,000	69,000	110,000	46,000	280,000
25.....	17,000	17,000	9,400	8,600	18,000	7,800	44,000	73,000	60,000	84,000	300,000	280,000
26.....	16,000	19,000	10,000	9,200	24,000	7,000	43,000	110,000	63,000	80,000	85,000	196,000
27.....	16,700	16,000	10,000	14,000	40,000	7,100	82,000	128,000	168,000	67,000	72,000	139,000
28.....	15,400	17,000	9,000	11,200	33,000	5,500	80,000	330,000	162,000	62,000	460,000	76,000
29.....	17,000	.....	10,500	9,000	24,000	6,400	150,000	318,000	135,000	54,000	520,000	68,000
30.....	.....	.....	10,500	.....	26,000	.....	128,000	390,000	.....	52,000	.....	140,000
31.....	27,000	.....	10,000	.....	40,000	110,000	175,000	1,030,000	254,000	900,000	1,300,000	280,000
Maximum.....	106,000	98,000	41,000	40,000	40,000	110,000	175,000	1,030,000	254,000	900,000	1,300,000	280,000
Minimum.....	16,400	15,700	8,000	7,400	5,800	5,500	9,500	52,000	37,000	52,000	44,000	20,000
Mean.....	34,700	28,700	13,350	13,200	12,800	17,500	67,000	165,000	94,930	144,500	187,470	75,200

*Daily and monthly discharges, in liters per second, of Angai River near Mutictic, Norzagaray, Bulacan, for the year 1913*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	174,000	87,000	24,800	11,800	26,400	9,600	18,700	226,000	125,000	27,500	26,500	
2	178,400	70,800	23,000	11,500	22,900	9,800	13,700	223,000	114,000	31,800	60,000	
3	109,000	69,000	21,700	10,200	22,500	10,000	11,800	216,000	154,000	31,400	37,000	
4	84,800	37,000	10,200	10,200	25,900	10,000	11,700	174,000	231,000	28,000		
5	79,000	43,900	52,450	9,600	23,700	11,600	10,400	82,000	203,000	25,000	420,000	
6	153,800	37,850	37,850	9,600	27,800	44,200	11,500	71,000	196,000	36,000	235,000	
7	90,900	38,500	35,900	9,600	100,900	18,400	11,200	106,000	149,000	30,500	155,900	
8	70,900	47,700	30,500	9,500	87,800	15,800	12,500	133,000	120,000	26,000	100,000	
9	145,400	68,900	28,700	9,500	62,100	14,000	13,000	224,000	146,000	23,000		
10	55,600	39,500	23,100	9,300	58,900	25,400	43,500	154,000	190,000	28,000		
11	72,100	35,300	21,900	9,300	56,100	24,900	40,000	104,000	380,000	24,000		
12	71,000	68,900	18,900	10,000	43,800	20,200	40,000	142,000	304,000	23,500		
13	69,600	49,100	17,000	19,400	38,100	15,500	31,000	139,000	201,000	47,000		
14	50,000	43,200	16,400	18,400	24,800	14,500	21,800	110,000	156,000	105,000		
15	45,550	38,700	15,500	15,300	18,300	17,000	111,000	102,000	61,000	77,000		
16	40,200	32,500	15,200	18,400	15,300	19,900	141,000	86,000	97,000	64,000		
17	38,500	25,700	13,800	47,200	20,500	19,400	77,000	74,000	71,000	56,000		
18	36,500	28,980	13,200	48,200	18,200	25,900	90,000	68,000	56,000	44,000		
19	30,400	28,400	12,700	32,500	14,500	27,100	232,000	87,000	53,000	44,000		
20	29,900	26,800	12,800	23,800	14,100	25,000	248,000	73,500	56,000	37,500		
21	29,200	26,200	12,300	24,700	13,500	15,100	78,000	77,000	50,000	33,000		
22	26,200	24,200	11,800	20,000	13,200	11,900	89,000	75,000	47,500	35,000		
23	29,000	23,700	11,500	17,700	13,900	12,800	98,000	81,000	36,500	31,000		
24	50,600	21,700	11,500	16,600	14,000	25,200	105,000	139,000	38,500	27,000		
25	46,100	21,000	11,000	36,100	11,700	10,400	103,000	132,000	38,500	26,500		
26	52,000	21,700	10,700	24,500	11,800	9,700	79,000	99,000	42,000	24,000		
27	46,300	19,700	14,600	22,900	12,300	60,000	308,000	33,500	33,500	22,500		
28	49,600	..	12,800	21,200	14,700	18,100	200,000	30,000	22,500	22,500		
29	51,400	..	10,700	24,200	13,500	16,700	690,000	112,000	27,500	21,000		
30	83,300	..	11,000	..	13,000	..	310,000	73,000	..	..		
31	..	..	..	..	..	..	..	..	..	..		
Maximum.	178,400	87,000	52,450	48,200	100,900	44,200	600,000	308,000	380,000	125,000	420,000	
Minimum	26,200	19,700	10,700	9,300	11,700	9,600	10,700	68,000	27,500	21,000	26,500	
Mean.....	70,300	41,700	19,600	19,400	28,400	18,400	96,000	129,000	117,000	38,800	138,188	



*Daily and monthly discharges, in liters per second, of Angat River near Matictic, Norzagaray, Bulacan, for the year 1918*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.									107,600	50,800	57,900	47,400
2.									85,000	44,000	49,950	44,000
3.									85,000	40,600	56,100	40,600
4.									75,000	47,400	52,500	50,800
5.									92,000	57,900	49,950	58,800
6.									314,000	67,200	45,700	50,800
7.									133,800	63,400	49,100	49,100
8.									97,000	61,500	54,300	47,400
9.								53,400	117,500	68,150	63,400	44,000
10.								49,100	123,000	61,500	61,500	66,250
11.								86,000	89,000	101,000	90,600	59,700
12.								93,000	77,000	79,000	91,000	56,100
13.									89,000	61,500	97,000	52,500
14.								137,500	120,800	57,000	97,000	50,800
15.								85,000	132,700	84,300	134,000	52,500
16.								83,000	123,500	188,000	184,700	64,350
17.								62,450	123,500	62,400	99,700	67,000
18.								97,000	83,000	82,300	81,000	63,400
19.								99,000	157,900	70,050	70,050	56,100
20.								85,000	176,900	168,600	63,400	48,200
21.								73,000	112,000	112,000	54,300	50,800
22.								99,000	75,000	73,000	49,100	44,000
23.								81,000	69,100	109,800	44,000	35,500
24.								85,000	65,300	61,500	48,250	30,250
25.								77,000	57,000	49,100	57,900	185,600
26.								99,000	51,650	49,100	51,650	172,650
27.								204,000	44,000	41,450	50,800	140,000
28.								157,000	45,700	30,250	52,500	124,200
29.								115,300	59,700	37,200	49,100	112,000
30.								112,000	65,300	65,300	114,200	114,200
31.									314,000	168,600	314,000	185,600
Maximum								204,000	314,000	168,600	314,000	185,600
Minimum								49,100	44,000	30,250	44,000	26,600
Mean								96,075	105,468	70,403	78,218	68,247

NOTE.—Daily discharge determined from a poorly-defined curve, applicable to December 31, 1920.

Daily and monthly discharges, in liters per second, of Angat River near Matitic, Norzagaray, Bulacan, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	167,250	13,900	17,400	9,100	4,600	9,500	13,350	210,400	291,000	42,300	140,000	395,000
2	125,400	11,700	15,200	9,100	4,600	12,250	12,250	194,700	182,700	40,600	167,600	254,000
3	136,400	10,600	16,000	9,100	4,300	16,200	45,250	161,850	127,800	38,900	243,200	182,700
4	131,900	17,300	17,400	8,700	4,600	10,050	22,400	117,500	120,800	47,400	165,300	185,300
5	133,200	17,400	17,400	8,300	5,500	10,600	15,600	132,600	113,100	52,500	127,800	145,300
6	351,000	67,300	14,450	7,900	18,000	9,500	13,900	182,700	103,200	47,400	105,400	355,400
7	220,000	87,000	12,800	17,400	10,050	7,900	12,800	248,900	91,000	45,700	87,000	179,800
8	220,000	87,000	10,600	16,200	7,900	5,900	15,000	328,000	86,000	127,800	93,000	157,900
9	146,250	76,700	10,600	13,350	4,900	7,500	18,600	550,800	79,000	161,850	93,000	140,000
10	134,200	62,500	9,500	10,600	3,700	52,500	29,500	498,100	73,000	185,600	83,000	120,800
11	61,000	32,500	9,100	9,100	3,400	71,000	15,600	1,171,200	69,100	130,200	83,000	112,000
12	62,450	28,750	15,000	8,700	4,600	31,750	12,250	917,100	69,100	117,500	70,050	103,200
13	62,500	28,750	12,800	9,100	4,900	19,800	10,050	795,000	81,000	107,600	65,300	95,000
14	45,700	20,200	11,150	8,700	4,900	18,600	9,100	466,600	61,500	101,000	57,900	98,000
15	41,450	20,400	11,150	8,300	6,700	16,200	7,100	366,400	61,500	101,000	54,300	86,000
16	37,200	21,000	10,500	7,500	4,600	13,350	8,300	405,000	70,050	130,200	50,800	80,000
17	34,000	25,000	10,600	7,500	8,400	12,250	8,300	272,000	61,500	114,200	49,100	87,000
18	23,500	19,800	9,500	7,500	3,100	13,900	19,800	176,900	77,000	93,000	47,400	81,000
19	25,900	16,200	9,500	7,100	2,500	23,100	13,900	137,500	76,000	81,000	172,650	77,000
20	25,800	13,900	9,500	7,100	14,450	23,000	13,350	132,600	64,350	95,000	140,000	74,000
21	39,700	26,400	12,800	7,100	7,900	16,800	25,900	469,300	65,300	93,000	107,600	69,100
22	65,300	22,400	12,250	6,700	23,800	26,600	26,600	215,200	65,300	77,000	89,000	66,250
23	42,300	22,400	11,150	6,300	12,800	10,050	40,600	157,900	57,000	73,000	77,000	63,400
24	29,500	19,800	10,600	5,500	11,700	9,500	70,050	133,800	53,400	63,400	73,000	66,250
25	25,900	17,400	10,600	5,500	8,300	13,350	70,050	242,100	50,800	64,350	66,250	68,150
26	23,800	16,800	10,600	5,200	5,500	8,700	31,750	723,400	49,100	63,400	92,000	72,000
27	21,000	21,400	9,100	5,200	8,300	8,700	31,750	383,400	49,100	127,800	112,000	75,000
28	19,800	19,800	8,300	4,900	26,600	7,900	86,000	251,200	47,400	107,600	133,800	73,000
29	17,400	.....	8,300	4,900	69,100	12,250	583,800	199,350	45,700	114,200	199,350	69,100
30	16,200	.....	8,700	4,900	13,100	11,700	237,200	185,600	44,000	116,400	501,000	73,000
31	15,000	.....	5,500	.....	15,600	236,800	236,800	233,600	.....	136,250	.....	69,100
Maximum	351,000	87,000	18,600	17,400	69,100	71,000	583,800	1,171,200	291,000	185,600	501,000	415,000
Minimum	15,000	10,500	8,300	4,900	2,500	5,900	7,100	117,500	44,000	38,900	47,400	63,400
Mean	77,842	31,330	11,721	8,245	10,684	16,833	58,715	340,851	82,860	93,456	114,383	129,305

Norz.—Daily discharges determined from a poorly defined curve. Applicable to December 31, 1920.

Daily and monthly discharges, in liters per second, of Angat River near Maticic, Norzagaray, Bulacan, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.	64,350	32,900	56,100	35,500	22,400	23,800	73,000	116,400	292,900	81,000	53,400	89,000
2.	63,500	35,500	48,250	31,000	28,000	29,500	65,300	106,500	242,100	71,000	52,500	130,200
3.	69,100	34,500	49,250	34,000	25,000	31,750	80,000	86,000	237,600	103,200	51,650	110,500
4.	69,100	34,500	49,250	34,000	25,000	31,750	80,000	86,000	237,600	103,200	51,650	110,500
5.	71,000	37,000	41,700	37,200	28,800	34,000	81,000	71,600	185,900	91,000	263,000	85,000
6.	69,100	34,500	49,250	34,000	25,000	31,750	80,000	86,000	237,600	103,200	51,650	110,500
7.	85,000	36,350	57,900	30,250	21,700	34,000	69,100	66,250	110,900	75,000	132,600	94,600
8.	85,000	36,350	57,900	30,250	21,700	34,000	69,100	66,250	110,900	75,000	132,600	94,600
9.	81,000	29,500	38,150	27,300	22,400	63,400	56,100	57,900	86,000	74,000	85,000	205,600
10.	81,000	29,500	38,150	27,300	22,400	63,400	56,100	57,900	86,000	74,000	85,000	205,600
11.	76,000	93,000	37,200	25,200	31,000	52,500	66,250	56,100	79,000	67,200	81,000	137,900
12.	71,000	73,000	34,000	23,800	28,000	53,400	67,200	57,900	86,000	71,000	114,200	103,200
13.	65,300	54,300	32,500	22,400	35,500	50,800	74,000	56,100	79,000	55,200	913,800	99,000
14.	59,700	45,700	31,750	24,500	34,000	38,900	94,000	57,900	79,000	52,500	472,000	93,000
15.	54,300	56,100	31,000	25,200	29,500	40,600	124,200	71,000	71,000	50,800	351,000	93,000
16.	50,800	67,200	29,500	26,600	34,750	38,900	101,000	71,000	62,450	69,100	630,000	420,000
17.	59,700	95,000	32,500	28,000	67,200	38,050	190,050	78,000	55,200	87,000	239,100	338,400
18.	116,400	103,200	38,900	26,600	49,100	31,000	507,000	97,000	50,800	68,150	171,309	207,200
19.	116,400	103,200	38,900	26,600	49,100	31,000	507,000	97,000	50,800	68,150	171,309	207,200
20.	77,000	80,000	31,750	25,200	37,200	28,750	1,194,300	67,200	90,000	77,000	138,750	168,000
21.	81,000	69,100	38,050	22,400	35,500	25,900	926,000	65,300	287,200	75,000	116,400	145,060
22.	73,000	52,500	31,000	21,000	33,250	44,000	931,000	62,450	235,300	65,300	112,000	123,130
23.	65,350	47,700	28,000	25,200	28,000	53,100	253,000	81,000	196,250	140,000	104,300	93,680
24.	57,300	47,700	28,000	25,200	28,000	53,100	253,000	81,000	196,250	140,000	104,300	93,680
25.	54,300	68,150	25,600	23,100	26,600	50,800	302,400	85,000	256,600	92,000	101,000	52,280
26.	52,500	108,700	26,600	25,200	25,200	49,100	174,000	101,000	187,050	71,000	95,000	49,720
27.	45,700	77,000	28,750	25,200	23,100	61,500	168,950	91,000	155,900	66,250	143,750	45,400
28.	45,700	65,300	34,000	25,200	22,400	53,400	169,950	174,000	135,000	65,300	117,500	40,400
29.	45,700	65,300	34,000	25,200	22,400	53,400	169,950	174,000	135,000	65,300	117,500	40,400
30.	42,300	30,250	28,000	23,800	28,000	86,000	135,000	150,100	105,400	59,700	84,000	43,400
31.	40,600	28,000	28,000	23,800	28,000	86,000	135,000	150,100	105,400	59,700	84,000	43,400
Maximum	116,400	108,700	57,900	40,600	67,200	86,000	1,194,300	174,000	292,900	140,000	913,800	420,000
Minimum	40,600	28,000	25,200	19,800	21,000	23,800	50,800	56,100	50,800	50,800	51,650	40,400
Mean	68,635	58,478	37,087	27,103	30,029	42,412	242,742	82,020	145,422	75,353	188,712	138,257

NOTE.—Daily discharges determined from a poorly defined curve. Applicable to December 31, 1920.

Daily and monthly discharges, in liters per second, of Angat River near Matictic, Norzagaray, Bulacan, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1...	48,720	40,600	36,600	11,000	8,800	7,100	10,200	67,600	132,500	56,600	136,600	87,800
2...	43,400	50,300	29,800	10,200	8,100	5,900	9,300	57,800	120,300	50,900	91,000	72,900
3...	41,400	34,800	25,200	9,500	7,400	7,100	15,600	56,600	120,300	46,500	215,500	74,300
4...	39,480	49,800	26,600	8,800	7,400	14,600	572,000	60,600	115,000	41,600	158,700	188,000
5...	38,400	40,300	18,250	11,400	11,000	8,800	553,000	62,600	102,600	48,700	73,600	149,700
6...	39,480	44,600	39,600	15,000	8,800	23,800	424,500	44,600	96,100	48,700	73,600	108,800
7...	38,400	46,600	128,400	23,800	11,000	23,800	356,500	424,500	96,100	48,700	62,600	70,200
8...	38,400	35,600	23,800	11,000	23,800	23,800	257,300	253,500	74,300	37,600	70,200	49,800
9...	35,600	39,600	23,800	18,200	8,450	33,100	163,400	173,500	60,200	36,600	583,000	34,800
10...	44,720	34,800	23,800	12,100	8,450	29,500	91,000	128,400	63,600	37,600	384,500	23,200
11...	48,720	23,200	120,300	12,100	8,450	29,500	91,000	128,400	63,600	37,600	1,963,000	21,200
12...	52,600	25,200	122,300	15,600	7,450	25,700	61,400	280,900	74,300	31,400	813,000	29,000
13...	47,550	31,350	55,400	12,700	7,200	21,200	46,600	280,900	74,300	31,400	201,750	15,600
14...	44,600	36,600	149,700	12,700	6,200	23,800	40,600	280,900	84,500	43,600	144,200	21,200
15...	44,600	40,600	126,350	11,800	6,200	23,800	36,600	253,500	77,500	38,600	154,200	63,900
16...	63,800	34,800	108,800	10,200	6,800	28,200	33,200	777,500	97,500	23,800	215,500	168,100
17...	103,000	28,600	78,600	10,200	6,200	23,200	33,200	2,203,000	97,500	23,200	184,200	163,700
18...	72,900	26,600	60,200	9,500	6,200	13,150	43,350	336,000	70,200	25,200	80,100	135,700
19...	83,100	42,600	46,600	18,800	6,200	11,200	45,600	336,000	86,200	23,200	80,100	123,300
20...	77,150	34,800	44,800	18,800	10,200	10,200	45,600	336,000	86,200	23,200	80,100	123,300
21...	65,100	34,800	29,800	13,100	10,200	10,200	39,600	221,750	110,700	21,200	58,600	123,300
22...	60,200	40,600	26,600	12,500	21,200	9,200	33,100	192,500	110,700	21,200	89,500	74,400
23...	55,400	42,600	22,300	12,500	19,500	8,800	33,950	158,200	82,900	18,800	389,500	52,200
24...	67,500	42,600	20,600	21,200	19,500	11,500	300,500	158,200	72,900	17,700	827,950	72,700
25...	36,600	38,600	15,600	13,150	8,100	14,500	149,500	149,500	91,000	18,800	1,821,600	128,100
26...	36,600	44,600	17,700	13,150	7,100	16,600	193,500	138,400	105,900	18,800	1,162,900	143,700
27...	28,200	42,600	15,600	13,150	6,500	11,000	124,300	138,400	105,900	16,600	389,500	84,500
28...	25,150	38,600	13,600	10,200	8,100	10,200	138,750	173,500	84,500	17,700	201,750	60,200
29...	21,200	13,600	12,700	9,500	8,800	10,200	132,600	136,600	62,600	18,800	105,000	46,500
30...	21,200	11,800	11,800	9,500	8,100	10,200	85,200	149,700	62,600	62,600	105,000	46,500
31	105,000	50,900	254,250	23,800	21,200	33,100	583,000	2,203,000	132,500	91,000	1,963,000	188,000
Maximum	21,200	50,900	254,250	23,800	21,200	33,100	583,000	2,203,000	132,500	91,000	1,963,000	188,000
Minimum	49,100	39,312	59,492	13,092	8,542	16,465	135,050	323,006	89,480	34,232	371,125	88,089
Mean...												

NOTE.—Discharge determined from well-defined rating curve, between 23,000 and 700,000 second-liters. Above and below these values are estimated from extension of rating curve. Rating curve made applicable from January 11, 1921, to March 13, 1922.

Daily and monthly discharges, in liters per second, of Angat River near Matictic, Norzagaray, Bulacan, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1...	37,600	66,300	22,500	15,950	9,100	13,300	38,000	140,350	19,550	145,350	61,500	183,300
2...	33,950	55,400	19,400	16,650	10,550	15,950	55,450	173,950	16,650	123,000	71,500	123,000
3...	48,700	46,600	15,600	14,600	10,550	17,350	94,150	126,350	33,100	161,100	11,000	236,900
4	41,600	37,600	14,600	13,600	10,550	17,350	178,350	98,550	48,650	123,000	294,200	276,200
5	37,600	61,400	13,600	11,600	10,050	13,300	119,350	88,550	38,600	175,950	269,200	416,200
6...	34,800	34,800	12,700	11,050	10,550	11,050	154,350	91,550	38,600	189,350	137,800	239,800
7...	30,800	69,200	12,250	10,550	10,050	15,950	127,150	163,950	40,050	115,900	118,700	185,050
8	33,950	42,600	12,700	10,050	18,250	15,950	227,150	193,950	66,600	89,350	140,800	150,900
9	26,800	36,800	14,600	10,050	18,250	26,450	136,150	194,750	54,800	86,350	103,700	125,900
10	28,200	26,800	14,600	19,450	14,600	26,450	89,950	198,350	54,800	93,200	157,900	107,750
11	28,700	23,150	26,800	17,350	33,100	66,500	96,950	71,850	45,350	83,100	110,450	80,600
12	52,000	20,000	26,800	44,250	15,950	43,200	73,200	54,300	38,000	83,100	106,400	120,100
13	37,800	17,700	21,100	26,000	13,300	35,000	87,150	54,300	80,150	85,600	74,600	105,050
14	57,800	21,850	16,650	31,250	13,300	29,490	66,600	33,100	56,650	72,200	68,600	89,350
15	42,800	18,800	18,050	20,300	13,950	25,150	56,650	44,250	73,200	59,200	79,400	84,350
16	45,600	15,800	15,250	14,600	15,250	45,350	64,050	56,650	57,850	65,000	67,400	95,800
17	42,800	23,800	13,950	12,700	12,700	31,250	81,550	222,950	372,750	52,400	83,100	118,700
18	34,800	18,250	12,700	12,150	11,050	36,000	98,350	150,150	176,300	84,350	72,200	94,500
19	26,600	17,700	11,600	11,050	8,200	29,450	105,350	124,950	127,350	73,400	81,850	83,100
20	38,700	16,600	10,550	18,050	7,800	46,450	137,550	94,150	110,450	74,600	88,100	458,200
21	42,600	15,600	11,050	15,250	21,900	38,000	98,350	74,550	128,800	68,600	97,100	279,700
22	34,800	14,600	10,550	16,650	112,350	31,250	81,550	60,300	151,550	73,400	120,100	128,800
23	36,600	13,600	9,550	11,050	82,950	39,000	126,350	48,650	178,050	65,000	109,100	106,400
24	33,100	12,700	11,050	10,550	38,000	33,100	78,750	38,000	143,800	56,900	123,000	91,900
25	31,400	11,800	44,250	10,050	26,000	24,300	66,600	32,150	113,150	61,500	118,700	374,200
26	32,250	12,700	74,550	9,100	20,300	20,300	88,550	24,300	130,900	60,350	98,200	362,200
27	120,300	15,600	37,000	10,550	18,800	54,300	98,350	19,550	195,950	60,350	71,000	169,500
28	185,500		27,700	10,550	20,300	38,000	74,550	14,600	169,500	78,200	66,200	140,800
29	124,300		24,300	12,700	16,650	26,850	89,950	10,550	153,100	68,600	205,300	123,000
30												
31	87,800		19,550		13,350		81,650	24,300				
Maximum	185,500	78,600	74,550	44,250	112,350	66,600	221,550	222,950	372,750	161,100	294,400	710,200
Minimum	26,600	11,800	9,550	9,100	7,800	11,050	38,000	10,550	46,650	52,400	19,450	80,600
Mean	50,560	29,741	19,976	15,833	21,752	30,296	94,294	77,990	96,300	84,836	113,963	196,402

Norz.—Discharge determined from rating curves applicable as follows: March 14, to September 18, 1922, well-defined below 87,000 second-liters; September 19 to December 31, 1922, fairly well-defined below 160,000 second-liters.

## BULACAN PROVINCE

## ANGAT RIVER, QUINGUA

LOCATION.—About 200 m. northwest from a bridge of the Manila Railroad Company, north of Quingua railroad station.

RECORDS AVAILABLE.—From July 24, 1909, to March 16, 1912.

GAGE.—No longer in existence. Formerly a horizontal gage board with chain and weight for measuring height.

DISCHARGE MEASUREMENTS.—Made from bridge.

CHANNEL AND BANKS.—Channel is straight for about 500 m. above and 200 m. below the gaging section. Banks are high and wooded but still subject to overflow; at measuring section stream bed is composed of clay, sand, and gravel. Flow rather sluggish.

EXTREMES OF DISCHARGE.—Maximum discharge during period of observation, 1,480,000 second-liters on July 24, 1911; minimum discharge, 7,500 second-liters on March 13, 14, 16, 1912.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge copied directly from records given, which according to remarks, were taken from a rating curve. Gage read twice daily.

*Discharge measurements of Angat River, near Quingua, Bulacan*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1909</b>				
August 7	F. T. Ryan	1.91	149,556	
August 16	do	1.14	45,340	
August 21	do	1.32	62,320	
August 28	do	1.20	41,170	
September 1	do	1.16	47,160	
September 6	do	1.20	44,730	
September 11	do	1.44	80,430	
September 18	do	2.15	193,200	
September 23	do	1.87	132,080	
October 3	do	1.53	93,935	
October 8	do	1.29	98,813	
October 16	do	1.25	57,251	
October 23	do	1.25	84,282	
October 25	do	4.65	653,878	
November 5	do	1.92	110,450	
November 11	do	2.35	189,880	
November 20	do	1.86	106,380	
November 27	do	1.92	106,950	
December 6	do	1.74	92,003	
December 11	do	1.75	98,784	
December 18	do	2.38	202,229	
December 24	do	1.57	68,234	
<b>1910</b>				
January 3	do	1.54	64,830	
February 26	do	1.25	26,269	
March 3	do	1.06	14,570	
March 9	do	1.06	16,370	
March 16	do	1.20	23,425	
March 29	do	1.19	24,306	
April 4	do	1.22	32,298	
April 18	do	1.09	14,118	
April 20	do	1.10	14,118	
April 25	do	3.18	37,024	
May 6	do	1.24	18,643	
May 11	do	1.23	17,564	
May 19	do	1.20	16,420	
May 23	do	1.54	43,004	
May 23	do	1.23	58,986	
June 23	do	1.46	36,144	

## Discharge measurements of Angat River, near Quingua, Bulacan—Cont.

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1910</b>				
July 12.....	F. T. Ryan.....	1.10	40,025	
July 19.....	do.....	1.20	53,298	
July 27.....	do.....	1.92	31,604	
August 24.....	do.....	1.52	76,196	
August 25.....	do.....	3.45	409,000	
August 31.....	do.....	1.20	42,649	
September 3.....	do.....	1.75	95,455	
September 12.....	do.....	1.58	78,770	
June 28.....	do.....	2.18	138,920	
October 11.....	W. B. Frisbie.....	1.86	85,670	
October 14.....	do.....	1.88	109,685	
October 15.....	do.....	1.90	121,460	
October 19.....	do.....	2.12	139,000	
October 26.....	do.....	1.52	67,081	
November 8.....	do.....	1.89	117,144	
November 16.....	do.....	2.57	1,215,084	
November 24.....	do.....	4.50	735,000	
December 13.....	do.....	1.72	69,026	
December 23.....	do.....	1.55	49,387	
December 27.....	do.....	1.69	71,685	
<b>1911</b>				
January 13.....	do.....	1.41	44,517	
January 17.....	do.....	1.34	45,604	
January 24.....	do.....	1.14	35,303	
February 2.....	do.....	1.04	28,025	
February 8.....	do.....	1.60	75,603	
February 11.....	do.....	1.29	48,042	
March 4.....	do.....	1.10	29,321	
March 9.....	do.....	.94	18,488	
March 18.....	do.....	.89	17,012	
March 27.....	do.....	1.75	86,823	
April 19.....	do.....	1.78	22,045	
April 25.....	do.....	1.33	47,932	
May 8.....	do.....	1.40	51,020	
May 24.....	do.....	1.09	24,450	
June 26.....	do.....	.97	16,841	
July 3.....	do.....	2.54	190,951	
July 19.....	do.....	4.19	637,578	
July 25.....	do.....	6.14	920,482	
August 2.....	do.....	3.80	445,524	
August 11.....	do.....	2.00	111,227	
August 21.....	do.....	2.15	118,423	
September 2.....	do.....	2.08	102,402	
September 25.....	do.....	1.45	65,012	
October 5.....	do.....	2.08	178,884	
October 16.....	do.....	1.54	50,621	
September 23.....	do.....	1.55	53,760	
November 2.....	do.....	1.23	42,075	
November 10.....	do.....	1.06	19,965	
November 22.....	do.....	1.40	42,534	
December 5.....	do.....	.96	16,258	
December 11.....	do.....	.99	16,920	
December 19.....	do.....	1.22	29,402	
<b>1912</b>				
January 3.....	do.....	1.03	18,884	
January 8.....	do.....	1.31	41,974	
January 22.....	do.....	1.05	19,933	
January 31.....	do.....	1.00	18,555	
February 6.....	do.....	1.72	82,900	
February 19.....	do.....	.91	13,819	
February 23.....	do.....	1.31	35,449	
March 2.....	do.....	.89	11,837	
March 8.....	do.....	.85	10,784	

*Daily and monthly discharges, in liters per second, of Angat River near Quingua, Bulacan, for the year 1909*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.									50,000	96,000	168,900	180,000
2.									52,000	89,000	180,000	132,000
3.									48,000	90,000	172,000	116,000
4.									46,000	90,000	116,000	114,000
5.									50,000	96,000	118,000	98,000
6.									47,000	103,000	118,000	86,000
7.									53,000	110,000	888,000	83,000
8.									42,000	104,000	1,040,000	76,000
9.									60,000	90,000	800,000	75,000
10.									82,000	89,000	218,000	76,000
11.									82,000	93,000	185,000	120,000
12.									82,000	79,000	164,000	114,000
13.									84,000	80,000	143,000	118,000
14.									107,000	73,000	138,000	123,000
15.									98,000	64,000	158,000	424,000
16.									98,000	64,000	910,000	226,000
17.								44,000	99,000	60,000	614,000	122,000
18.								86,000	148,000	53,000	466,000	210,000
19.								59,000	242,000	123,000	130,000	30,000
20.								63,000	283,000	73,000	113,000	174,000
21.								114,000	266,000	62,000	104,000	114,000
22.								114,000	230,000	57,000	80,000	85,000
23.								65,000	148,000	1,100,000	88,000	72,000
24.							80,000	50,000	123,000	985,000	80,300	68,000
25.								46,000	128,000	280,000	70,000	107,000
26.								41,000	116,000	300,000	77,000	86,000
27.							79,000	41,000	102,000	217,000	112,000	65,000
28.								41,000	92,000	317,000	228,000	65,000
29.								42,000	94,000	162,000	372,000	70,000
30.								44,000	102,000	340,000	450,000	106,000
31.								53,000		194,000		91,000
Maximum							80,000	114,000	285,000	1,100,000	1,040,000	424,000
Minimum							79,000	41,000	42,000	53,000	70,000	56,000
Mean								55,930	108,000	176,160	284,770	124,740

NOTE.—Data for July 25 and 26 not given. Gage washed away by flood July 28 and had not been restored until August 17.



Daily and monthly discharges, in liters per second, of Angat River near Quingua, Bulacan, for the year 1910

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	95,000	38,000	24,000	50,000	37,000	147,000	90,000	54,000	75,000	154,000	72,000	124,000
2	75,000	54,000	21,000	38,000	26,000	158,000	80,000	41,000	63,000	120,000	608,000	104,000
3	67,000	58,000	14,000	32,000	35,000	124,000	162,000	72,000	90,000	122,000	500,000	276,000
4	162,000	60,000	16,000	33,000	19,000	96,000	186,000	54,000	220,000	99,000	320,000	522,000
5	270,000	79,000	13,000	32,000	18,000	370,000	120,000	65,000	200,000	58,000	365,000	406,000
6	134,000	107,000	18,000	32,000	33,000	160,000	80,000	58,000	252,000	80,000	300,000	250,000
7	88,000	105,000	19,000	27,000	31,000	136,000	73,000	49,000	210,000	82,000	300,000	194,000
8	72,000	100,000	17,000	28,000	30,000	174,000	62,000	66,000	134,000	73,000	164,000	144,000
9	63,000	64,000	16,000	30,000	21,000	184,000	54,000	47,000	184,000	71,000	144,000	120,000
10	65,000	62,000	18,000	25,000	20,000	144,000	68,000	49,000	124,000	72,000	124,000	84,000
11	72,000	46,000	18,000	22,000	17,000	112,000	50,000	47,000	89,000	440,000	96,000	76,000
12	62,000	64,000	16,000	20,000	14,000	92,000	42,000	49,000	78,000	200,000	85,000	69,000
13	58,000	76,000	12,000	16,000	30,000	72,000	56,000	49,000	68,000	120,000	35,000	69,000
14	53,000	66,000	24,000	12,500	24,000	68,000	50,000	44,000	64,000	116,000	418,000	112,000
15	48,000	56,000	26,000	11,000	18,000	70,000	50,000	39,000	52,000	109,000	420,000	85,000
16	47,000	62,000	23,000	13,000	29,000	64,000	56,000	42,000	77,000	108,000	164,000	163,000
17	51,000	52,000	22,000	11,500	24,000	64,000	60,000	43,000	180,000	276,000	182,000	109,000
18	56,000	43,000	19,000	12,000	19,000	64,000	76,000	72,000	160,000	216,000	994,000	178,000
19	50,000	47,000	18,000	12,000	16,000	64,000	54,000	46,000	142,000	144,000	833,000	75,000
20	58,000	52,000	15,000	13,000	16,000	64,000	47,000	43,000	158,000	111,000	833,000	60,000
21	54,000	56,000	16,000	16,000	18,000	56,000	45,000	43,000	140,000	90,000	535,000	60,000
22	55,000	50,000	17,000	13,000	39,000	45,000	38,000	49,000	249,000	83,000	820,000	55,000
23	53,000	43,000	17,000	13,000	40,000	38,000	40,000	45,000	218,000	82,000	708,000	50,000
24	54,000	35,000	20,000	80,000	48,000	44,000	41,000	45,000	175,000	82,000	560,000	65,000
25	47,000	30,000	30,000	860,000	64,000	44,000	32,000	262,000	155,000	78,000	800,000	54,000
26	39,000	26,000	40,000	140,000	94,000	50,000	36,000	190,000	150,000	67,000	300,000	54,000
27	40,000	24,000	31,000	80,000	129,000	55,000	27,000	100,000	170,000	67,000	170,000	67,000
28	45,000	26,000	27,000	58,000	124,000	78,000	32,000	54,000	178,000	64,000	152,000	120,000
29	44,000	23,000	23,000	44,000	31,000	78,000	32,000	47,000	176,000	60,000	135,000	260,000
30	40,000	30,000	30,000	37,000	124,000	72,000	32,000	43,000	192,000	60,000	138,000	163,000
31	36,000	72,000	72,000	37,000	280,000	72,000	32,000	42,000	192,000	52,000	...	114,000
Maximum	270,000	107,000	72,000	350,000	314,000	370,000	186,000	262,000	440,000	440,000	708,000	522,000
Minimum	36,000	24,000	12,000	11,000	14,000	38,000	27,040	39,000	63,000	52,000	72,000	50,000
Mean	69,450	56,110	22,350	43,370	54,871	99,230	61,260	59,650	153,570	115,387	290,370	184,030

Daily and monthly discharges, in liters per second, of Angat River near Quingua, Bulacan, for the year 1911

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	86,000	28,000	18,000	40,000	30,000	25,000	50,000	262,000	120,000	346,000	39,000	18,000
2.....	71,000	26,000	17,000	36,000	28,000	17,000	*562,000	470,000	104,000	130,000	42,000	18,000
3.....	63,000	24,000	22,000	32,000	31,000	26,000	190,000	500,000	92,000	110,000	40,000	17,000
4.....	58,000	21,000	32,000	28,000	24,000	26,000	103,000	400,000	78,000	100,000	41,000	17,000
5.....	55,000	24,000	34,000	28,000	70,000	27,000	126,000	260,000	71,000	102,000	39,000	17,000
6.....	54,000	48,000	30,000	42,000	70,000	27,000	72,000	185,000	72,000	96,000	33,000	17,500
7.....	76,000	118,000	23,000	34,000	50,000	25,000	58,000	158,000	70,000	96,000	30,000	18,000
8.....	68,000	73,000	20,000	27,000	57,000	28,000	54,000	136,000	63,000	45,000	26,000	17,000
9.....	37,000	52,000	18,000	26,000	36,000	25,000	46,000	124,000	56,000	39,000	22,000	17,500
10.....	47,000	46,000	17,000	25,000	35,500	25,000	64,000	114,000	58,000	37,000	20,000	17,000
11.....	42,000	170,000	15,000	27,500	46,000	47,000	66,000	113,000	53,000	34,000	19,000	16,000
12.....	50,000	148,000	40,000	25,000	40,000	48,000	62,000	134,000	51,000	53,000	17,000	13,000
13.....	49,000	90,000	27,000	23,000	29,000	40,000	88,000	190,000	47,000	58,000	19,000	19,000
14.....	48,000	70,000	20,000	21,500	23,000	29,000	360,000	175,000	44,000	70,000	17,000	16,000
15.....	43,000	54,000	18,000	25,000	20,500	30,000	648,000	320,000	39,000	63,000	20,000	16,000
16.....	38,000	46,000	17,500	22,000	20,500	25,000	1,080,000	138,000	41,000	61,000	37,000	25,000
17.....	43,000	40,000	17,000	21,000	22,000	24,000	1,240,000	178,000	40,000	51,000	68,000	52,000
18.....	40,000	36,000	16,000	23,000	21,000	28,000	600,000	135,000	43,000	175,000	61,000	34,000
19.....	34,000	38,000	73,000	17,000	18,000	41,000	380,000	118,000	42,000	112,000	60,000	30,000
20.....	31,000	30,000	92,000	21,000	33,000	28,000	386,000	120,000	82,000	77,000	39,000	28,000
21.....	30,000	26,000	46,000	25,000	27,000	22,000	424,000	103,000	120,000	63,000	44,000	31,000
22.....	30,000	28,000	34,000	34,000	29,000	19,000	580,000	88,000	102,000	54,000	33,000	29,000
23.....	36,000	23,000	38,000	236,000	22,000	18,000	1,480,000	90,000	50,000	51,000	30,000	28,000
24.....	22,000	26,000	26,000	76,000	15,000	20,000	1,130,000	82,000	50,000	50,000	26,000	23,000
25.....	36,000	21,000	100,000	50,000	25,000	18,500	824,000	85,000	33,000	50,000	24,000	23,000
26.....	68,000	21,000	96,000	42,000	34,000	17,000	600,000	81,000	48,000	50,000	24,000	22,000
27.....	63,000	19,000	125,000	46,000	35,000	34,000	416,000	81,000	68,000	46,000	20,000	26,000
28.....	39,000	.....	101,000	42,000	30,000	43,000	370,000	89,000	120,000	44,000	20,000	24,000
29.....	33,000	.....	69,000	36,000	23,000	50,000	370,000	108,000	558,000	42,000	19,000	20,000
30.....	33,000	.....	49,000	.....	36,000	.....	310,000	160,000	.....	40,000	.....	20,000
31.....	32,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maximum.....	86,000	170,000	125,000	236,000	70,000	67,000	1,480,000	500,000	588,000	346,000	68,000	52,000
Minimum.....	30,000	19,000	15,000	17,000	15,000	17,000	46,000	81,000	33,000	34,000	17,000	13,000
Mean.....	48,130	50,840	40,790	40,000	32,110	30,420	406,030	172,320	84,400	77,390	32,470	22,650

\* Unreliable.

*Daily and monthly discharges, in liters per second, of Angat River near Quingua, Bulacan, for the year 1912*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	20,000	26,000	13,000	.....	.....	.....	.....	.....	.....	.....	.....	.....
2.....	19,000	27,000	10,000	.....	.....	.....	.....	.....	.....	.....	.....	.....
3.....	18,000	19,000	19,000	.....	.....	.....	.....	.....	.....	.....	.....	.....
4.....	17,000	20,000	19,000	.....	.....	.....	.....	.....	.....	.....	.....	.....
5.....	142,000	18,000	13,000	.....	.....	.....	.....	.....	.....	.....	.....	.....
6.....	83,000	80,000	12,000	.....	.....	.....	.....	.....	.....	.....	.....	.....
7.....	52,000	75,000	9,600	.....	.....	.....	.....	.....	.....	.....	.....	.....
8.....	47,000	64,000	9,400	.....	.....	.....	.....	.....	.....	.....	.....	.....
9.....	42,000	46,000	9,500	.....	.....	.....	.....	.....	.....	.....	.....	.....
10.....	37,000	37,000	9,000	.....	.....	.....	.....	.....	.....	.....	.....	.....
11.....	30,000	30,000	8,000	.....	.....	.....	.....	.....	.....	.....	.....	.....
12.....	30,000	25,000	8,000	.....	.....	.....	.....	.....	.....	.....	.....	.....
13.....	90,000	23,000	7,500	.....	.....	.....	.....	.....	.....	.....	.....	.....
14.....	83,000	21,000	8,000	.....	.....	.....	.....	.....	.....	.....	.....	.....
15.....	56,000	19,000	8,000	.....	.....	.....	.....	.....	.....	.....	.....	.....
16.....	42,000	15,000	7,500	.....	.....	.....	.....	.....	.....	.....	.....	.....
17.....	39,000	16,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
18.....	26,000	14,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
19.....	25,000	14,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
20.....	22,000	16,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
21.....	20,000	14,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
22.....	19,000	36,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
23.....	17,000	84,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
24.....	16,500	22,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
25.....	16,000	18,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
26.....	16,500	17,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
27.....	16,000	16,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
28.....	16,500	14,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
29.....	14,000	13,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
30.....	13,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
31.....	15,500	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maximum.....	142,000	80,000	13,000	.....	.....	.....	.....	.....	.....	.....	.....	.....
Minimum.....	13,000	13,000	9,500	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mean.....	35,374	27,170	9,560	.....	.....	.....	.....	.....	.....	.....	.....	.....

Note.—Station maintenance abandoned after March 17.

## BULACAN PROVINCE

## BULO RIVER, SAN MIGUEL

LOCATION.—About 600 m. above the Public Schools or about 800 m. from the old dam site at the sitio Bardias, barrio of Kinamatayan Kabayo.

RECORDS AVAILABLE.—September 21, 1918, to April 30, 1922.

GAGE.—Horizontal gage board wired and nailed to a camachile tree and graduated with nails from .01 m. to 4 m. Chain and weight is used for reading heights.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND BANKS.—Channel is straight for about 20 m. above and 30 m. below. Right bank low, subject to overflow; left high, covered with bamboos. Stream bed at measuring section sandy and gravelly. Affords good measurement at low water stage.

EXTREMES OF DISCHARGE.—Maximum discharge during period of observation, 128,865 second-liters on August 16, 1921. River was dry on some of the days in 1922.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge determined from fairly well-defined rating curves. Dry season flow cannot be accurately determined due to intermittent record obtained during that season. Gage read twice daily.

*Discharge measurements of Bulo River, near Bardias, San Miguel, Bulacan*

Date	Made by--	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1918</b>				
September 21. . . . .	F. Aquino and A. Baldonado.	1 43	11,900	.. . . .
December 10 . . . . .	F. Aquino. . . . .	61	240	.. . . .
December 23. . . . .	do. . . . .	56	123	.. . . .
<b>1919</b>				
January 21 . . . . .	do. . . . .	54	49	.. . . .
June 24 . . . . .	do. . . . .	1 23	3,552	.. . . .
September 19 . . . . .	J. S. Roxas . . . . .	87	1,453	.. . . .
October 29. . . . .	do. . . . .	91	1,304	.. . . .
November 19 . . . . .	J. Roxas and B. B. Buchanan	1 27	4,501	.. . . .
<b>1920</b>				
January 9 . . . . .	J. S. Roxas. . . . .	.79	496	.. . . .
February 10 . . . . .	do. . . . .	.74	66	.. . . .
February 25 . . . . .	do. . . . .	.71	28	.. . . .
April 13. . . . .	do. . . . .	.70	22	.. . . .
May 14. . . . .	do. . . . .	.69	55	.. . . .
June 11 . . . . .	do. . . . .	.87	355	.. . . .
June 11 . . . . .	do. . . . .	.87	278	.. . . .
August 2 . . . . .	do. . . . .	.73	127	.. . . .
September 10 . . . . .	do. . . . .	2 04	11,840	.. . . .
September 10 . . . . .	do. . . . .	2 03	9,634	.. . . .
September 11. . . . .	do. . . . .	1 48	4,053	.. . . .
October 13. . . . .	do. . . . .	87	358	.. . . .
<b>1921</b>				
January 13. . . . .	do. . . . .	1 03	218	.. . . .
February 20. . . . .	do. . . . .	1 00	20	.. . . .
March 11. . . . .	do. . . . .	1 05	111	.. . . .
September 13. . . . .	do. . . . .	2.05	5,846	.. . . .
September 13 . . . . .	do. . . . .	2 07	6,436	.. . . .
September 13. . . . .	do. . . . .	2 15	7,128	.. . . .
September 13. . . . .	do. . . . .	2 10	6,798	.. . . .
September 14 . . . . .	do. . . . .	1 99	5,412	.. . . .
November 21 . . . . .	do. . . . .	1.53	1,409	.. . . .
<b>1922</b>				
January 21. . . . .	do. . . . .	1.33	56	.. . . .
February 2. . . . .	do. . . . .	1 31	34	.. . . .
April 10. . . . .	do. . . . .	.. . . .	.. . . .	Dry.

*Daily and monthly discharges, in liters per second, of Bulo River near Kinamatayan Cabayo, San Miguel, Bulacan,  
for the year 1918*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,180	850	250
2	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,155	.....	227
3	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,060	735	204
4	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,585	698	204
5	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,255	628	204
6	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,155	595	204
7	.....	.....	.....	.....	.....	.....	.....	.....	.....	970	595	183
8	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,902	498	204
9	.....	.....	.....	.....	.....	.....	.....	.....	.....	4,110	498	227
10	.....	.....	.....	.....	.....	.....	.....	.....	.....	890	530	204
11	.....	.....	.....	.....	.....	.....	.....	.....	.....	890	595	183
12	.....	.....	.....	.....	.....	.....	.....	.....	.....	890	465	204
13	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,155	405	204
14	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,370	970	204
15	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,060	1,060	204
16	.....	.....	.....	.....	.....	.....	.....	.....	.....	10,850	890	204
17	.....	.....	.....	.....	.....	.....	.....	.....	.....	5,882	970	183
18	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,585	890	183
19	.....	.....	.....	.....	.....	.....	.....	.....	.....	13,325	498	183
20	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,490	465	183
21	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,922	405	183
22	.....	.....	.....	.....	.....	.....	.....	.....	.....	5,580	405	183
23	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,325	405	162
24	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,922	352	123
25	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,648	352	123
26	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,845	300	106
27	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,685	250	106
28	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,465	250	227
29	.....	.....	.....	.....	.....	.....	.....	.....	.....	890	1,355	106
30	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,015	227	106
31	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,970	275	106
Maximum	.....	.....	.....	.....	.....	.....	.....	.....	.....	890	.....	.....
Minimum	.....	.....	.....	.....	.....	.....	.....	.....	.....	13,325	1,648	250
Mean	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,512	551	180

Note.—Discharge determined from fairly well-defined rating curve, applicable from September 21, 1918 to November 29, 1919. Record fair between 40 to 4,200 second-liters.

*Daily and monthly discharges, in liters per second, of Bulo River near Kinamatayan Cabayo, San Miguel, Bulacan, for the year 1919*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1...	162	90	51	51	37	75	275	11,510	3,665	595	5,995	.....
2...	162	90	51	51	37	75	930	4,015	3,325	562	24,050	2,625
3...	162	90	51	51	37	75	930	3,728	3,440	530	4,490	3,395
4...	162	90	51	51	37	75	930	3,728	3,440	530	4,490	3,395
5...	162	90	51	51	37	60	1,465	32,350	3,325	850	3,755	7,215
6...	162	60	51	735	37	60	1,015	27,350	3,325	810	3,665	12,590
7...	123	75	51	90	37	60	1,070	27,185	3,325	850	1,465	8,310
8...	142	90	51	60	37	60	1,060	41,560	6,215	1,205	1,465	4,570
9...	162	60	51	51	37	60	1,060	44,180	6,215	5,682	1,305	2,925
10...	183	60	51	51	37	60	1,060	44,345	6,215	4,395	1,155	2,475
11...	162	60	51	51	37	183	890	11,510	6,215	6,215	4,015	1,390
12...	162	60	51	37	37	183	890	90,380	10,210	2,690	1,465	1,275
13...	142	70	51	37	22	142	890	54,740	8,000	3,000	1,255	6,502
14...	132	60	51	37	22	142	890	44,900	3,752	3,182	1,060	3,808
15...	132	60	51	37	22	163	275	44,840	1,210	3,182	595	1,520
16...	123	60	51	37	22	42	275	44,840	1,103	4,205	498	600
17...	123	75	51	37	22	42	10,850	42,850	1,060	2,690	530	525
18...	123	90	51	37	22	162	10,850	42,850	1,155	18,770	4,395	455
19...	106	90	51	37	22	142	810	a 5,275	970	21,080	5,175	395
20...	106	60	51	37	22	123	352	a 5,275	970	7,010	1,465	370
21...	90	75	51	37	22	850	90	44,510	810	11,015	3,160	370
22...	90	75	51	37	106	890	75	42,850	810	4,205	1,155	345
23...	90	75	51	37	106	2,690	970	41,560	810	1,465	890	345
24...	90	51	51	37	106	3,840	4,205	106,385	595	1,155	970	345
25...	90	51	51	37	106	3,840	352	75,390	628	1,325	590	295
26...	90	51	51	37	106	3,840	352	75,390	628	1,325	590	295
27...	75	51	51	37	123	300	4,582	17,120	660	1,618	35,606	275
28...	75	51	51	37	123	300	83,780	8,840	660	2,540	17,780	255
29...	75	51	51	37	123	275	22,070	3,665	628	1,255	17,780	285
30...	162	70	51	37	123	530	14,150	3,752	628	1,255	17,780	285
31...	106	70	51	37	90	530	14,150	3,752	628	1,255	17,780	215
Maximum	183	90	51	735	123	3,840	83,780	106,385	10,210	21,080	35,606	12,590
Minimum	75	51	51	37	22	42	75	3,665	595	530	498	215
Mean	126	70	51	67	52	404	5,799	35,833	3,022	3,977	4,713	2,207

NOTE.—No record on August 21, 1919.

\* Unreliable

*Daily and monthly discharges, in liters per second, of Bulo River near Kinamatayan Cubayo, San Miguel, Bulacan,  
for the year 1920*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	200	90	72	50	35	170	1,055	4,400	42,970	3,560	1,110	205
2.....	200	90	64	50	35	170	815	3,560	10,800	7,540	1,110	280
3.....	200	90	64	50	35	155	525	3,230	4,658	3,808	1,055	280
4.....	200	90	64	50	35	345	1,332	2,700	3,312	2,925	9,760	280
5.....	185	90	64	50	35	275	815	2,195	3,975	2,625	3,395	280
6.....	170	90	57	50	35	320	860	1,785	4,230	4,060	6,025	240
7.....	170	90	57	50	35	320	955	1,390	3,560	3,395	2,775	405
8.....	170	90	57	50	35	320	955	1,332	3,075	2,925	2,335	340
9.....	170	90	57	50	35	320	955	1,390	2,925	2,475	1,920	405
10.....	170	90	57	50	35	320	955	1,390	2,925	2,475	1,920	405
11.....	155	90	57	50	35	320	955	1,390	2,925	2,475	1,920	405
12.....	155	90	57	125	525	225	6,592	4,742	2,775	2,475	3,785	360
13.....	155	90	57	100	430	320	1,532	4,742	2,775	2,475	3,785	360
14.....	155	90	57	125	430	320	2,332	1,785	2,555	2,335	2,195	205
15.....	155	90	72	64	425	215	2,332	18,940	2,195	3,230	2,055	280
16.....	155	90	72	50	395	185	3,075	6,025	2,195	3,230	1,785	360
17.....	155	90	50	50	395	185	3,075	4,400	1,785	2,700	1,785	320
18.....	155	112	50	50	525	185	1,390	4,920	2,625	2,405	1,370	280
19.....	140	100	50	50	370	155	15,025	8,090	1,920	2,055	915	578
20.....	140	170	50	50	395	100	39,595	3,808	3,000	5,095	605	290
21.....	125	140	50	50	395	90	35,545	2,775	5,652	2,775	475	240
22.....	125	140	50	50	455	80	39,595	2,195	13,270	4,060	405	205
23.....	112	125	50	50	455	2,775	46,345	4,658	4,485	3,230	320	175
24.....	112	100	50	50	295	2,385	22,720	3,230	3,230	2,625	280	175
25.....	112	80	50	50	215	860	6,502	3,560	11,380	2,195	260	162
26.....	100	80	50	50	215	370	3,808	24,475	6,800	1,718	240	150
27.....	100	80	50	50	215	295	3,230	22,720	44,995	1,615	240	176
28.....	100	80	50	50	155	1,055	3,808	15,970	8,310	1,615	222	162
29.....	100	72	50	50	125	1,055	18,670	5,610	4,805	1,970	205	160
30.....	100	72	50	50	125	2,625	6,502	4,060	4,060	1,165	205	188
31.....	90	.....	50	50	170	.....	6,502	6,405	4,060	1,165	.....	158
Maximum.....	200	170	72	125	600	2,775	46,345	24,475	44,995	7,540	9,760	578
Minimum.....	90	82	50	50	35	80	525	1,332	1,785	1,165	205	138
Mean.....	145	82	54	55	237	552	9,102	5,810	7,354	2,809	1,945	257

NOTE.—Discharge determined from fairly well-defined rating curve, applicable from December 2, 1919, to November 15, 1920. Record fair between 20 to 10,000 second-liters.

*Daily and monthly discharges, in liters per second, of Bulo River near Kinamatayan Cabayo, San Miguel, Bulacan, for the year 1921*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	125	65	50	45	30	65	2,085	1,850	25,840	1,545	1,545	2,706
2.....	125	65	50	45	25	65	1,205	2,635	19,015	1,907	985	2,366
3.....	125	65	50	45	25	60	1,327	2,435	19,015	1,545	1,205	2,026
4.....	112	65	50	45	280	55	43,290	2,635	5,465	1,455	1,205	1,856
5.....	112	112	72	45	320	10,565	30,715	2,145	4,530	1,455	1,205	1,601
6.....	112	100	100	45	80	780	2,085	3,140	11,540	1,545	1,130	1,345
7.....	112	100	100	45	80	4,120	1,205	3,035	1,055	2,035	1,130	1,176
8.....	100	100	80	45	80	2,320	1,205	3,035	1,055	2,035	1,130	1,176
9.....	100	90	112	45	72	2,320	450	4,755	9,755	1,205	3,710	1,006
10.....	90	80	112	45	65	280	550	2,875	1,235	1,130	1,455	1,886
11.....	90	80	100	45	65	240	475	2,960	3,710	1,092	26,165	1,006
12.....	90	80	100	45	65	320	475	3,915	15,440	1,545	7,980	921
13.....	90	80	80	45	60	300	360	10,565	6,662	1,545	3,710	886
14.....	90	80	80	45	55	320	340	7,685	3,915	1,055	6,250	886
15.....	80	72	65	45	50	720	280	89,565	3,710	1,780	4,325	921
16.....	80	72	55	45	50	577	360	128,865	7,685	632	3,320	2,961
17.....	80	65	45	45	45	360	4,325	28,540	4,755	1,055	3,710	2,961
18.....	80	65	45	45	50	175	7,242	28,540	4,755	1,055	3,710	1,886
19.....	80	65	45	45	50	175	7,242	6,805	10,890	1,130	3,710	1,771
20.....	80	60	45	40	45	175	7,845	6,112	13,490	1,370	1,965	1,345
21.....	80	60	45	40	45	175	7,845	4,325	8,290	1,455	1,695	886
22.....	80	55	60	35	35	205	985	12,515	4,222	1,092	1,370	886
23.....	80	55	65	35	35	1,055	845	21,615	2,960	1,092	2,085	751
24.....	80	55	65	35	40	845	845	5,847	4,755	1,092	6,805	666
25.....	80	65	45	35	50	450	12,190	4,017	4,325	1,092	2,960	496
26.....	80	60	40	35	50	405	7,390	2,712	3,140	985	3,515	496
27.....	80	55	40	35	55	280	340	22,785	2,960	985	5,256	496
28.....	72	50	40	30	240	605	2,465	30,390	2,465	985	3,566	416
29.....	72	.....	40	30	240	605	2,465	30,390	2,465	985	3,566	416
30.....	72	.....	40	30	100	845	2,790	5,465	1,965	985	3,386	340
31.....	65	.....	45	.....	125	.....	2,085	5,465	1,965	1,205	.....	340
Maximum	125	112	112	45	320	10,565	43,390	128,865	25,840	2,340	26,165	2,961
Minimum	65	50	40	30	25	55	280	1,850	1,055	632	985	840
Mean.....	90	74	65	41	83	931	4,385	15,160	6,653	1,259	3,860	1,196

Note.—Discharge determined from fairly well-defined rating curve, applicable from November 16, 1920, to November 26, 1921. Record fair between 60 and 8,000 second-liters.



*Daily and monthly discharges, in liters per second, of Bulo River near Kinamatayan Cabayo, San Miguel, Bulacan, for the year 1922*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	275	20	(d)	22								
2.....	275	10	(d)	22								
3.....	275	10	(d)	(d)								
4.....	215	10	(d)	(d)								
5.....	219	20	(d)	(d)								
6.....	219	20	(d)	(d)								
7.....	172	20	34	(d)								
8.....	134	10	78	(d)								
9.....	134	10	78									
10.....	134	10	34									
11.....	103	2	2									
12.....	103	2	(d)									
13.....	103	2	2									
14.....	103	2	2									
15.....	103	2	2									
16.....	134	(d)	2									
17.....	134	(d)	2									
18.....	78	(d)	2									
19.....	56	20	2									
20.....	56	56	2									
21.....	34	56	2									
22.....	34	103	20									
23.....	34	103	10									
24.....	34	78	2									
25.....	34	56	2									
26.....	34	56	2									
27.....	34	(d)	10	10								
28.....	20	(d)	20	56								
29.....	20	20	2	34								
30.....	20	20	(d)	34								
31.....	20	20	2	56								
Maximum.....	275	103	78	56								
Minimum.....	20	20	15	9								
Mean.....	112	30	15	9								

<sup>a</sup> Channel dry.

## BULACAN PROVINCE

## MAASIM RIVER, SAN RAFAEL

LOCATION.—At the steel railroad bridge, about 500 m. north of the railroad station at Maasim and about 1.1 km. east of Km. Post No. 63 of the Manila North Road.

RECORDS AVAILABLE.—From January 29, 1919, to December 31, 1922.

GAGE.—Standard metric gage board nailed horizontally to guard rail at middle of bridge. Chain and weight used for determining gage heights and heads.

DISCHARGE MEASUREMENTS.—Made from bridge and by weirs.

CHANNEL AND BANKS.—Channel several at low water; straight for about 100 m. above and 70 m. below the station. Banks are high, not subject to overflow and covered with trees. Stream bed rocky, gravel, and sandy and is shifting.

EXTREMES OF DISCHARGE.—Maximum discharge during period of observation, 110,720 second-liters on August 16, 1921; minimum discharge, 18 second-liters on April 12, 1922.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge for 1919 and 1920 determined from a poorly defined curve. The station is a poor one. Gage heights read twice daily. Conditions of weirs fair. Record for 1921 and 1922 fairly good.

*Discharge measurements of Maasim River, near Maasim,  
San Rafael, Bulacan*

Year	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1919</b>				
February 11. . . . .	A. Diaz	1 01	327	
March 3 . . . . .	A. Diaz and J. Roxas	1 00	100	
March 7 . . . . .	J. Roxas	1 00	142	
March 21 . . . . .	do	.98	75	
March 24 . . . . .	do	.98	79	
May 3 . . . . .	do	1 02	60	
June 12 . . . . .	do	1.21	919	
September 20 . . . . .	do	1.54	4,044	
October 31 . . . . .	do	1 87	10,486	
November 18 . . . . .	do	1 46	1,757	
<b>1920</b>				
January 7 . . . . .	do	1 45	1,174	
February 5 . . . . .	do	1.14	540	
February 10 . . . . .	do	1.14	561	
February 24 . . . . .	do	1 14	527	
April 14 . . . . .	do	1.00	113	

Daily and monthly discharges, in liters per second, of Maasim River near Maasim, San Rafael, Bulacan, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	120	80	80	80	80	260	1,190	13,140	3,530	1,220	2,730	8,300
2	120	100	100	80	80	260	1,340	4,890	2,980	1,190	3,480	3,600
3	120	100	100	100	120	260	1,830	3,130	2,980	1,190	2,430	3,030
4	120	100	100	100	130	380	1,160	2,220	2,630	1,690	2,300	2,780
5	120	100	100	110	145	320	890	4,260	2,300	1,655	1,830	3,380
6	120	100	100	100	145	380	740	8,630	3,530	1,340	1,725	3,380
7	120	100	100	90	130	360	740	12,490	3,230	1,280	1,760	5,160
8	120	90	90	90	120	320	650	19,000	2,980	2,220	1,725	5,960
9	120	120	90	90	120	320	650	47,440	2,480	3,030	1,620	3,910
10	120	120	90	90	120	450	680	39,240	2,480	2,440	1,830	2,880
11	110	110	90	90	130	1,010	590	35,240	2,530	2,830	1,760	2,880
12	110	110	90	145	130	540	590	37,440	2,980	2,830	1,655	2,530
13	110	110	90	145	130	470	560	28,040	2,380	2,380	1,480	2,340
14	100	100	90	145	145	440	560	15,120	1,900	2,380	1,410	2,220
15	100	100	90	130	145	440	530	25,840	2,060	2,260	1,340	2,060
16	100	100	90	120	145	680	2,780	8,300	1,865	2,220	1,340	1,720
17	100	100	90	120	145	680	2,780	8,080	1,830	1,980	1,340	1,720
18	100	100	90	120	120	680	800	5,070	1,795	1,900	1,480	1,695
19	100	100	90	120	120	680	860	4,710	1,655	3,675	1,410	1,655
20	100	100	90	120	160	1,100	860	11,030	1,585	2,580	1,550	1,620
21	100	100	80	100	180	950	800	4,620	1,515	1,900	1,530	1,585
22	100	100	80	100	180	800	800	3,395	1,410	1,760	1,550	1,550
23	100	100	80	90	220	710	920	8,995	1,160	1,655	1,445	1,550
24	100	100	80	90	350	710	920	18,300	1,340	1,655	1,410	1,515
25	100	100	80	80	290	1,070	2,980	25,840	1,310	1,760	1,310	1,480
26	100	100	80	80	220	710	2,980	10,250	1,310	1,980	1,690	1,480
27	80	80	80	100	250	620	8,190	5,960	1,310	2,100	16,340	1,480
28	120	120	80	100	250	620	8,190	4,800	1,250	1,760	4,710	1,410
29	120	120	80	90	330	620	8,190	4,800	1,250	2,180	48,240	1,375
30	120	120	80	90	330	620	8,190	4,800	1,250	2,180	48,240	1,375
31	120	120	80	90	410	620	8,190	4,800	1,250	2,180	48,240	1,375
Maximum	120	120	100	145	410	3,180	8,190	47,440	3,530	8,740	48,240	8,300
Minimum	80	80	80	80	80	220	530	2,220	1,160	1,190	1,375	1,375
Mean	120	107	88	105	172	694	1,694	14,448	2,202	2,356	3,871	2,561

NOTE.—Discharges determined from poorly defined curve. No record for days on which discharge is not given.

Daily and monthly discharges, in liters per second, of Maasin River near Maasin, San Rafael, Bulacan, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.	1,240	1,040	380	590	770	1,795	800	1,040	1,040	4,680	2,580	2,730
2.	1,310	1,040	380	590	920	1,620	740	950	1,040	4,680	2,580	2,730
3.	1,310	1,040	380	590	920	1,795	950	950	1,040	4,680	2,580	2,730
4.	1,310	1,010	350	590	920	1,795	1,010	680	1,040	3,905	2,480	2,680
5.	1,310	1,010	320	590	980	1,445	860	740	980	3,970	2,530	2,680
6.	1,310	980	320	590	980	1,480	860	740	890	5,700	2,780	3,180
7.	1,310	980	290	590	1,070	1,480	980	770	950	4,370	4,445	4,445
8.	1,310	680	260	560	1,040	1,480	860	830	1,250	3,720	2,830	3,600
9.	1,280	650	260	560	1,040	1,620	980	860	1,160	3,480	2,580	3,080
10.	1,280	650	240	560	1,310	1,865	920	860	3,720	3,880	2,530	2,830
11.	1,280	650	220	560	1,010	2,220	860	950	4,765	3,330	2,780	2,780
12.	1,280	650	220	560	1,070	1,445	1,040	950	8,270	3,720	2,480	2,630
13.	1,280	620	200	830	1,100	1,690	920	950	6,500	3,230	4,300	2,530
14.	1,280	620	200	920	1,160	1,900	890	1,040	3,870	3,280	3,600	2,480
15.	1,280	590	200	650	1,340	1,220	980	950	14,900	3,330	3,600	2,880
16.	1,280	590	180	620	1,280	1,310	1,040	950	6,400	3,180	14,250	2,680
17.	1,280	560	680	680	1,220	1,310	1,040	1,040	7,540	3,970	4,850	2,980
18.	1,280	560	680	680	1,310	1,190	1,040	500	5,700	3,720	3,720	2,980
19.	1,280	530	680	590	1,110	1,190	980	560	5,220	3,130	3,360	2,580
20.	1,160	530	680	590	1,110	1,190	980	620	4,850	3,280	3,280	2,530
21.	1,160	530	680	620	1,375	1,160	950	620	4,850	3,980	3,980	2,530
22.	1,160	530	650	740	1,410	1,220	1,040	680	3,720	3,980	3,980	2,480
23.	1,160	500	620	680	1,375	1,190	1,040	770	4,300	2,980	2,980	2,480
24.	1,160	500	620	710	1,310	1,160	1,040	740	5,020	2,930	2,880	2,430
25.	1,160	470	620	680	1,220	1,160	980	680	15,030	2,880	2,880	2,430
26.	1,160	470	620	860	1,190	1,190	830	770	19,320	2,880	2,880	2,380
27.	1,160	440	590	740	1,190	1,190	830	830	19,320	2,780	2,780	2,380
28.	1,160	440	590	740	1,220	1,190	1,040	1,040	10,610	2,730	2,780	2,380
29.	1,160	410	590	740	1,190	1,190	1,040	1,040	6,300	2,680	2,680	2,300
30.	1,040	.....	590	740	1,375	1,010	980	1,040	4,935	2,680	2,680	2,300
31.	1,040	.....	590	.....	1,280	.....	1,040	1,040	.....	.....	.....	2,300
Maximum.	1,340	1,040	680	860	1,410	2,220	1,040	1,040	19,320	5,700	14,250	4,445
Minimum.	1,040	410	180	560	770	1,010	740	542	500	2,880	2,480	2,300
Mean	1,228	644	447	659	1,171	1,428	951	842	5,355	3,361	3,401	2,704

NOTE.—Discharges determined from poorly defined curve. No record for days on which discharge is not given.

Daily and monthly discharges, in liters per second, of Maasin River near Maasin, San Rafael, Bulacan, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	1,200	482	263	200	50	27	394	2,750	5,860	3,131	606	4,440
2.....	1,200	482	263	143	93	75	394	2,384	5,760	3,131	606	3,760
3.....	1,200	482	263	143	93	110	12,620	2,585	5,760	2,750	846	3,760
4.....	1,200	482	263	143	133	170	3,240	2,585	5,760	2,750	846	3,760
5.....	1,200	482	263	143	133	215	31,240	2,039	4,190	2,585	496	3,131
6.....	1,200	482	263	143	93	215	4,620	6,360	4,620	2,750	394	2,384
7.....	1,200	482	263	143	93	215	3,131	17,040	4,620	2,750	394	2,384
8.....	1,200	482	263	143	93	1,113	3,131	7,040	4,350	3,131	394	2,039
9.....	1,200	482	263	143	93	1,872	2,565	9,070	3,750	2,039	1,553	1,710
10.....	1,200	482	263	143	50	2,039	2,565	5,960	3,750	2,039	1,553	1,710
11.....	960	482	482	143	50	1,113	2,900	5,760	24,640	1,872	1,553	1,401
12.....	960	482	482	143	50	2,039	2,039	7,310	18,020	2,039	5,760	1,710
13.....	960	482	482	143	50	3,990	1,710	7,420	11,840	1,553	3,530	1,710
14.....	960	404	404	143	50	1,113	1,401	13,920	8,300	1,401	2,750	1,710
15.....	960	404	404	143	50	1,113	1,113	58,800	10,120	1,249	3,750	1,710
16.....	960	404	404	93	50	977	1,249	110,720	9,760	1,113	5,760	1,710
17.....	920	331	331	93	53	846	3,600	61,440	10,380	1,113	14,570	1,553
18.....	920	331	331	93	143	606	2,600	12,100	8,740	977	4,800	1,553
19.....	920	331	331	93	143	496	22,640	10,120	6,060	846	3,750	1,401
20.....	920	331	331	93	93	496	12,620	7,310	5,160	846	3,131	1,401
21.....	404	331	263	93	93	1,113	2,840	6,260	4,620	846	2,750	1,401
22.....	482	263	263	50	93	2,672	2,840	8,300	5,760	723	2,585	1,249
23.....	564	263	263	50	50	2,240	2,840	6,360	5,160	723	2,585	1,401
24.....	564	263	263	50	50	2,240	11,840	5,860	5,860	606	4,800	1,113
25.....	564	263	263	50	50	1,113	6,980	5,860	5,860	606	4,800	1,113
26.....	564	263	200	50	143	215	5,170	5,560	5,160	606	12,620	1,113
27.....	564	263	200	50	143	606	4,170	5,560	4,530	606	10,120	977
28.....	564	263	200	50	93	606	3,830	5,860	4,530	496	5,560	977
29.....	564	263	200	50	143	496	3,330	5,460	3,600	496	4,260	846
30.....	482	.....	200	50	50	394	2,600	6,360	3,131	496	9,180	846
31.....	482	.....	200	.....	50	.....	3,131	6,060	.....	496	.....	846
Maximum.....	1,200	651	564	200	143	3,990	31,240	110,720	24,640	3,131	14,570	4,440
Minimum.....	263	263	200	50	50	27	394	2,039	3,131	496	394	846
Mean.....	826	413	337	106	84	890	6,318	17,096	7,073	1,564	4,520	1,787

NOTE.—Discharges over 3,131 second-liters computed by A/D method based on weir measurements.

Daily and monthly discharges, in liters per second, of Maasim River near Maasim, San Rafael, Bulacan, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.	846	394	140	27	50	394	1,710	7,420	1,249	8,740	606	394
2.	846	394	140	27	143	2,209	2,039	18,860	1,113	8,740	496	496
3.	846	394	140	27	1,035	846	6,360	15,540	4,620	7,420	496	723
4.	846	394	140	27	846	846	4,980	15,540	1,401	6,360	846	2,039
5.	723	301	140	27	606	846	9,070	6,360	1,113	5,560	4,530	3,131
6.	723	301	140	27	846	846	9,070	6,360	3,600	5,560	3,131	3,131
7.	723	301	75	27	846	496	12,620	4,440	14,570	4,260	1,249	3,131
8.	723	301	75	27	2,209	394	11,840	4,850	4,440	4,260	846	2,039
9.	606	301	75	27	1,113	5,760	7,860	4,950	5,560	3,750	846	846
10.	606	301	75	27	1,553	8,080	4,620	10,120	5,160	3,830	846	606
11.	606	301	75	27	1,710	6,760	4,530	6,560	5,160	3,670	606	496
12.	606	301	75	27	1,248	3,131	3,675	4,620	5,360	3,380	606	394
13.	606	301	75	27	2,209	2,384	2,733	3,910	4,620	3,131	394	801
14.	606	301	75	27	606	2,384	2,733	3,910	16,560	2,888	394	215
15.	606	301	75	27	606	2,384	2,733	3,910	1,120	2,888	394	215
16.	606	301	75	27	846	2,384	2,733	3,910	8,080	2,888	496	140
17.	606	301	75	27	846	2,384	2,733	3,910	8,080	2,888	496	140
18.	606	301	75	27	496	1,249	1,401	4,260	41,840	2,384	394	75
19.	496	394	75	27	723	6,760	4,980	13,660	63,700	2,039	394	75
20.	496	394	75	27	394	2,384	5,260	7,550	20,460	1,710	215	7,860
21.	496	394	75	27	394	1,553	5,960	5,560	8,300	1,710	215	8,080
22.	394	394	75	27	394	1,401	8,080	3,910	8,300	2,209	215	2,039
23.	394	394	75	27	394	2,384	11,160	3,460	3,660	1,401	215	1,113
24.	394	394	75	27	2,384	1,710	11,160	2,750	24,840	1,248	215	846
25.	394	394	75	27	1,249	1,401	6,260	2,384	12,880	1,113	394	2,209
26.	394	394	75	27	846	1,113	4,440	3,600	10,380	1,113	394	2,209
27.	394	394	75	27	846	846	6,160	3,395	8,520	846	301	2,384
28.	394	394	75	27	846	846	6,160	2,260	6,160	846	301	1,553
29.	394	394	75	27	496	846	6,160	1,553	11,160	846	301	1,113
30.	394	394	27	50	394	846	6,060	1,553	11,160	606	440	846
31.	394	394	27	50	394	846	6,060	1,401	1,401	606	440	606
Maximum	846	394	140	263	2,384	8,080	12,620	18,860	63,700	8,740	4,530	8,080
Minimum	394	140	27	18	50	394	1,401	1,401	1,113	606	215	75
Mean	577	248	83	57	882	2,187	5,736	5,611	10,794	3,150	664	1,434

Note.—Discharges over 3,330 second-liters were computed by A/D method based on weir measurements. No record for days on which discharge is not given.

## BULACAN PROVINCE

## PAMPANGA RIVER, CALUMPIT

**LOCATION.**—At railroad bridge about 300 m. north of Calumpit Railroad Station.

**RECORDS AVAILABLE.**—From May 17, 1910, to March 16, 1912.

**GAGE.**—Standard metric gage board nailed horizontally at downstream railing of bridge near left bank of river.

**DISCHARGE MEASUREMENTS.**—Made from bridge.

**CHANNEL AND BANKS.**—Channel only one at all stages; curved for 100 m. above and straight for 150 m. below the station. Banks high and clean. Stream bed sandy and clean but shifting

**EXTREMES OF DISCHARGE.**—Maximum discharge during period of observation, 1,560,400 second-liters on July 27, 1911; minimum discharge, 34,400 second-liters on December 4, 1911.

**DIVERSIONS.**—None.

**REGULATION.**—None.

**UTILIZATION.**—For irrigation purposes.

**ACCURACY.**—Daily discharge determined from a fairly well-defined rating curve from 60,000 to 480,000 second-liters. The station is a fair one. Gage read twice daily.

*Discharge measurements of Pampanga River, near Calumpit, Bulacan*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1910</b>				
June 23 . . . . .	J. A. Steere . . . . .	.82	69,901	
July 12 . . . . .	do. . . . .	.84	83,184	
July 27 . . . . .	do. . . . .	.75	89,285	
August 24 . . . . .	do. . . . .	.90	97,923	
September 3 . . . . .	do. . . . .	1.57	253,155	
September 14 . . . . .	do. . . . .	1.47	371,560	
September 29 . . . . .	do. . . . .	2.41	585,600	
October 13 . . . . .	do. . . . .	1.88	452,630	
October 27 . . . . .	do. . . . .	1.01	217,059	
October 31 . . . . .	do. . . . .	.91	59,163	
November 12 . . . . .	do. . . . .	1.23	237,679	
November 22 . . . . .	do. . . . .	1.79	476,703	
November 26 . . . . .	do. . . . .	1.94	572,486	
December 2 . . . . .	do. . . . .	1.09	269,033	
December 6 . . . . .	do. . . . .	1.99	694,371	
December 14 . . . . .	do. . . . .	.76	153,624	
December 23 . . . . .	do. . . . .	.97	184,245	
<b>1911</b>				
January 7 . . . . .	do. . . . .	.62	182,419	
January 13 . . . . .	do. . . . .	.54	165,072	
January 20 . . . . .	do. . . . .	.49	83,927	
January 28 . . . . .	do. . . . .	.42	104,381	
February 2 . . . . .	do. . . . .	.52	65,950	
February 14 . . . . .	do. . . . .	1.10	240,712	
March 11 . . . . .	do. . . . .	.36	92,165	
July 5 . . . . .	do. . . . .	1.29	215,244	
July 27 . . . . .	do. . . . .	4.62	1,560,400	
August 11 . . . . .	do. . . . .	3.10	790,252	
September 2 . . . . .	do. . . . .	2.45	636,070	
September 26 . . . . .	do. . . . .	1.39	315,175	
October 5 . . . . .	do. . . . .	4.31	1,304,621	
October 16 . . . . .	do. . . . .	2.36	640,785	
October 23 . . . . .	do. . . . .	1.27	320,819	
November 1 . . . . .	do. . . . .	.70	198,300	

Daily and monthly discharges, in liters per second, of Pampanga River near Calumpit, Bulacan, for the year 1910

Day	January	February	March	April	May	June	July	August	September	October	November	December
1						418,400	196,000	191,200	330,600	720,800	115,000	261,600
2						368,000	189,600	220,000	330,600	699,200	239,200	239,200
3						323,800	242,400	252,000	334,000	710,000	548,000	648,800
4						261,600	351,000	251,600	327,200	699,200	527,200	495,200
5						200,800	351,000	212,000	488,200	688,000	527,200	556,400
6						186,000	351,000	212,000	488,200	688,000	447,200	556,400
7						156,000	252,000	226,400	540,800	590,400	327,200	418,400
8						197,600	232,800	232,800	555,200	579,600	268,000	347,600
9						216,800	242,400	229,600	552,400	558,800	280,800	245,600
10						220,000	242,400	239,200	519,200	497,600	268,000	197,600
11						197,600	210,400	274,000	472,400	681,200	274,400	166,000
12						184,800	188,600	248,800	425,600	627,200	239,200	142,000
13						175,200	204,000	280,800	389,600	512,000	239,200	142,000
14						152,000	232,000	280,800	389,600	512,000	239,200	142,000
15						152,000	232,000	274,000	368,000	396,800	509,200	178,400
16						133,000	229,600	264,000	425,600	382,400	436,800	178,400
17					207,200	115,000	216,800	284,000	443,600	396,800	447,200	204,000
18					80,150	118,000	216,800	284,000	540,800	483,200	526,400	197,600
19					59,800	118,000	216,800	271,200	568,800	396,800	605,600	210,400
20					51,200	169,000	223,200	252,000	586,800	347,600	512,000	207,200
21					71,400	191,200	220,000	232,800	648,000	306,800	426,400	152,000
22					168,000	213,800	232,800	270,000	688,000	270,400	426,400	152,000
23					188,000	213,800	232,800	270,000	688,000	270,400	426,400	152,000
24					210,400	255,200	232,800	226,400	786,200	264,800	692,000	112,000
25					220,000	252,000	216,800	315,200	627,200	255,200	627,200	100,400
26					320,400	196,600	207,200	436,400	641,600	242,400	497,600	77,200
27					354,400	205,600	197,600	533,600	641,600	213,600	399,400	112,000
28					411,200	205,600	184,800	300,000	648,800	204,000	334,000	264,800
29					429,200	212,000	172,000	287,200	692,600	172,000	298,600	172,000
30					443,600	212,000	172,000	293,600	753,200	163,000	261,600	166,000
31							178,400	310,200		136,000		
Maximum					443,600	418,400	351,000	533,600	786,200	720,800	695,000	648,800
Minimum					51,200	115,000	172,000	191,200	327,200	136,000	115,000	77,200
Mean					210,623	208,040	221,133	273,916	520,450	435,903	410,627	230,820



Daily and monthly discharges, in liters per second, of Pampanga River near Calumpit, Bulacan, for the year 1911

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	148,000	106,200	71,400	118,000	172,000	210,400	210,400	1,450,000	677,600	1,051,800	163,000	85,900
2	136,000	112,000	59,800	133,000	166,000	191,200	212,800	1,438,000	706,400	1,048,000	187,000	80,100
3	157,000	118,000	62,700	145,000	175,200	181,600	530,000	1,418,000	705,400	1,141,100	154,000	67,500
4	148,000	130,000	77,200	148,000	172,000	184,000	494,000	1,382,000	310,200	1,318,000	130,000	34,400
5	143,000	106,200	136,000	157,000	160,000	118,000	368,000	1,334,000	623,600	1,430,000	103,300	45,600
6	138,000	118,000	130,000	160,000	172,000	97,500	363,400	1,282,000	591,200	1,430,000	85,900	65,600
7	154,000	118,000	127,000	145,000	160,000	90,900	271,200	1,219,100	566,000	1,402,000	103,300	83,000
8	142,000	136,000	124,000	115,000	109,100	109,100	255,200	1,141,100	530,000	1,354,000	103,300	127,000
9	136,000	124,000	112,000	106,200	85,900	130,000	242,400	1,067,000	494,000	1,294,000	90,900	163,000
10	121,000	112,000	106,200	90,900	80,100	139,000	258,400	991,000	454,000	1,215,200	118,000	175,200
11	109,100	100,400	88,000	67,500	106,200	175,200	313,600	945,400	404,000	1,121,600	127,000	152,000
12	100,400	118,000	71,400	85,900	103,300	172,000	257,200	915,000	364,000	1,096,200	133,000	156,000
13	109,100	210,400	65,600	77,200	109,100	194,400	271,200	832,000	354,000	996,200	133,000	156,000
14	122,000	162,000	83,000	109,100	146,000	138,000	586,000	892,000	293,600	994,600	103,300	103,300
15	123,000	152,000	83,000	109,100	146,000	138,000	586,000	892,000	293,600	994,600	103,300	103,300
16	135,000	152,000	83,000	115,000	153,000	178,400	1,133,300	922,600	280,800	738,200	124,000	62,700
17	145,000	145,000	103,300	136,000	154,000	175,200	1,133,300	850,400	293,600	692,000	115,000	40,000
18	151,000	130,000	97,500	136,000	154,000	175,200	1,302,000	839,000	310,200	540,800	77,200	77,200
19	136,000	103,300	112,000	136,000	160,000	169,000	1,350,000	812,400	323,800	579,600	83,000	74,300
20	127,000	90,900	106,200	136,000	163,000	184,800	1,410,000	789,900	432,800	530,000	71,400	77,200
21	127,000	83,000	136,000	127,000	148,000	130,000	1,456,000	775,100	425,600	422,000	74,300	77,200
22	124,000	83,000	118,600	118,000	139,000	105,000	1,470,200	767,600	425,600	384,000	88,000	80,100
23	100,400	88,000	115,000	112,000	127,000	116,200	1,470,200	749,600	501,200	280,800	94,600	87,500
24	88,000	77,200	106,200	142,000	115,000	136,000	1,523,500	677,600	458,000	258,400	94,600	88,000
25	88,000	71,400	94,600	157,000	85,900	178,400	1,544,000	677,600	375,200	245,600	100,400	97,500
26	94,600	..	74,300	106,200	97,500	213,600	1,552,200	656,000	337,600	222,600	103,300	85,900
27	112,000	..	90,900	136,000	136,000	176,800	1,560,200	636,000	337,600	222,600	103,300	85,900
28	110,400	..	100,400	136,000	136,000	176,800	1,560,200	636,000	337,600	222,600	103,300	85,900
29	100,400	..	100,400	136,000	136,000	210,400	1,544,000	602,000	728,000	200,800	106,200	83,000
30	97,500	..	100,400	166,000	166,000	207,200	1,515,000	602,000	1,044,200	178,400	88,000	83,000
31	100,400	..	103,300	..	220,000	..	1,482,500	677,600	..	175,200	..	56,900
Maximum	157,000	210,400	136,000	166,000	220,000	216,800	1,560,400	1,450,000	1,044,200	1,430,000	163,000	175,200
Minimum	88,000	71,400	59,800	67,500	80,100	90,900	210,400	602,000	280,800	175,200	71,400	34,400
Mean	122,332	120,328	97,390	122,057	148,158	164,970	907,106	915,597	466,260	743,674	109,797	91,085

NOTE.—No gage height records for dates in which discharges are not given.



## BULACAN PROVINCE

## SANTA MARIA RIVER, SANTA MARIA

LOCATION.—About 31.76 km. from Manila and under the concrete bridge on the Bocaue-Santa Maria Road.

RECORDS AVAILABLE.—From October 25, 1919, to December 31, 1922.

GAGE.—Standard metric gage horizontally clamped to railing, 36 m. from left abutment on downstream side of bridge. Chain and weight used in measuring gage height.

DISCHARGE MEASUREMENTS.—Made from bridge.

CHANNEL AND BANKS.—Channel is straight for 300 m. above and below the station. Both banks low and wooded; subject to overflow and scour. At measuring section, stream bed of clay, earth, gravel and sand and shifting. Flow uniform.

EXTREMES OF DISCHARGE.—Maximum discharge during period of observation, 221,180 second-liters on July 18, 1920; minimum discharge, 20 second-liters on January 7, 1920. Gage heights from January to June, 1919, practically uniform at 0.05 meter.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For water right purposes.

ACCURACY.—Gage read twice daily. Records in 1919 and 1920 poor; in 1921 and 1922 fair.

*Discharge measurements of Santa Maria River, near Poblacion,  
San Miguel, Bulacan*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1919</b>				
October 22.	J. S. Roxas	2 82	7,087	
November 20 . . . .	J. S. Roxas and B. Buchanan.	2 58	3,808	
December 1. . . . .	J. S. Roxas	2 92	23,302	
<b>1920</b>				
January 12. . . . .	do	2 44	895	
February 9. . . . .	do	2 36	482	
February 20 . . . . .	do	2 44	778	
April 15. . . . .	do	2 32	534	
June 4. . . . .	do	2 37	386	
June 20. . . . .	do	2 39	316	
July 6 . . . . .	do	2 39	405	
July 21. . . . .	do	3 64	117,561	
July 22 . . . . .	do	3 86	172,104	
August 4 . . . . .	do	3 56	109,165	
August 30 . . . . .	do	3 69	119,713	
August 31 . . . . .	do	3 86	175,439	
September 1 . . . . .	do	3 80	146,893	
November 29. . . . .	do	2 39	403	
December 6. . . . .	do	3 14	64,970	
<b>1921</b>				
January 12. . . . .	do	2 24	1,113	
February 4. . . . .	do	2 31	1,530	
February 25. . . . .	do	2 08	209	
March 8 . . . . .	do	2 21	690	
March 19. . . . .	Castillo	2 14	409	
April 7. . . . .	do	2 08	154	
May 29. . . . .	Castillo and Roxas.	2 13	236	
May 31. . . . .	do	2 09	166	
June 2 . . . . .	do	2 08	132	
July 8. . . . .	Roxas	2 08	3,387	
July 23. . . . .	do	2 48	3,468	
August 11. . . . .	do	2 67	10,400	

*Discharge measurements of Santa Maria River, near Poblacion,  
San Miguel, Bulacan—Continued*

Date	Made by—	Gage height (meters)	Discharge (second- liters)	Remarks
<b>1921</b>				
September 7 . . . . .	Roxas . . . . .	2.50	7,491	
September 22 . . . . .	do. . . . .	2.60	12,349	
October 15 . . . . .	do. . . . .	2.25	2,382	
November 6 . . . . .	do. . . . .	2.02	1,397	
December 28 . . . . .	do. . . . .	2.16	1,132	
<b>1922</b>				
February 2 . . . . .	do. . . . .	2.00	343	
February 8 . . . . .	do. . . . .	2.08	511	
March 20 . . . . .	do. . . . .	2.00	308	
April 4 . . . . .	do. . . . .	2.00	83	
April 5 . . . . .	do. . . . .	2.01	48	
May 30 . . . . .	do. . . . .	2.61	9,519	
June 5 . . . . .	do. . . . .	2.13	1,518	
June 28 . . . . .	do. . . . .	2.30	3,941	
July 19 . . . . .	do. . . . .	2.64	15,190	
August 4 . . . . .	do. . . . .	2.60	11,871	
August 5 . . . . .	do. . . . .	2.59	11,541	
September 1 . . . . .	do. . . . .	2.33	6,541	
September 4 . . . . .	do. . . . .	2.46	7,584	
October 17 . . . . .	do. . . . .	2.31	6,494	
November 8 . . . . .	Castillo . . . . .	2.27	3,051	
November 26 . . . . .	Roxas . . . . .	2.10	2,661	
November 27 . . . . .	do. . . . .	2.09	1,935	
December 9 . . . . .	Castillo . . . . .	2.31	4,643	
December 11 . . . . .	Roxas . . . . .	2.28	2,463	
December 26 . . . . .	do. . . . .	2.37	5,824	

*Daily and monthly discharges, in liters per second, of Santa Maria River near Poblacion, Santa Maria, Bulacan,  
for the year 1919*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	..										20,900	28,600
2	..										30,500	21,720
3	..										13,180	23,860
4	..										6,540	23,860
5	..										3,520	23,860
6	..										7,560	23,860
7	..										5,400	8,540
8	..										4,200	10,700
9	..										3,520	8,000
10	..										4,600	2,400
11	..										2,960	2,400
12	..										2,960	820
13	..										2,400	1,960
14	..										1,960	4,200
15	..										5,400	1,960
16	..										980	980
17	..										1,520	460
18	..										10,700	100
19	..										21,720	380
20	..										3,800	260
21	..										5,400	500
22	..										3,520	340
23	..										1,520	340
24	..										2,960	300
25	..										1,520	350
26	..										2,960	350
27	..										74,740	840
28	..										46,320	460
29	..										8,540	980
30	..										31,500	980
31	..										32,500	820
											13,180	420
Maximum											74,740	28,600
Minimum											500	100
Mean											11,645	5,362

NOTE.—Discharge determined from poorly defined rating curve.

*Daily and monthly discharges, in liters per second, of Santa Maria River near Poblacion, Santa Maria, Bulacan, for the year 1920*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	820	500	260	140	100	380	5,800	13,180	34,500	8,540	420	2,400
2.....	180	500	260	100	100	420	3,520	6,240	36,580	8,540	300	2,400
3.....	100	500	180	100	140	380	4,600	2,400	26,800	16,520	420	2,960
4.....	60	460	100	80	100	340	4,200	2,680	30,500	20,160	660	2,960
5.....	60	.....	100	100	100	340	2,400	1,740	34,500	13,180	380	2,960
6.....	40	660	100	100	60	420	2,400	1,140	21,720	17,200	550	51,980
7.....	20	500	100	80	80	420	123,820	500	17,940	24,180	820	47,440
8.....	60	420	180	100	100	340	92,520	420	10,160	26,800	500	44,100
9.....	180	340	180	100	80	340	47,440	420	4,200	22,540	420	82,500
10.....	180	340	180	80	100	340	23,360	420	4,200	6,240	220	23,600
11.....	180	340	260	100	180	340	31,500	500	5,800	1,820	180	13,180
12.....	820	420	220	100	260	340	30,500	380	2,400	1,820	* 60	8,000
13.....	820	340	180	140	260	380	34,500	420	1,520	500	62,800	4,200
14.....	660	340	260	340	340	340	32,500	460	2,680	500	45,200	4,200
15.....	820	420	180	340	220	380	38,660	820	1,960	460	45,200	25,000
16.....	820	340	220	340	420	340	27,700	500	2,180	500	18,580	6,680
17.....	17.....	420	260	260	340	380	221,180	420	1,300	500	500	5,800
18.....	1,140	340	220	260	420	380	110,220	460	1,960	500	6,800	5,800
19.....	1,140	420	220	260	340	380	143,280	500	4,200	420	2,680	2,458
20.....	820	420	220	260	500	420	178,220	500	5,800	980	1,140	2,792
21.....	820	340	260	260	500	380	36,580	820	3,520	500	660	2,458
22.....	980	340	180	100	500	380	23,360	500	7,560	500	500	2,299
23.....	820	340	180	100	500	420	18,680	500	15,840	420	420	2,077
24.....	820	340	220	100	500	420	21,720	500	20,900	420	420	2,005
25.....	820	340	180	100	500	420	19,420	500	27,700	460	340	2,005
26.....	820	260	180	100	500	500	20,160	11,940	59,140	660	420	1,808
27.....	820	260	220	180	500	500	29,500	15,160	26,800	340	500	1,869
28.....	820	260	220	100	500	820	34,500	22,540	17,200	420	460	1,787
29.....	820	.....	180	100	820	1,960	20,160	32,500	.....	380	820	1,489
30.....	820	.....	140	.....	500	.....	.....	.....	.....	.....	.....	.....
31.....	500	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maximum..	1,140	660	260	340	820	1,960	221,180	32,500	59,140	26,800	69,300	51,980
Minimum..	20	260	100	80	60	340	2,400	380	1,300	340	* 60	1,489
Mean....	590	384	197	155	363	449	50,510	4,068	15,000	5,703	9,877	10,995

NOTE.—Discharge determined from poorly defined rating curve.  
\* Unreliable.

*Daily and monthly discharges, in liters per second, of Santa Maria River near Poblacion, Santa Maria, Bulacan,  
for the year 1921*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	1,489	566	44	276	98	214	1,144	6,670	8,310	5,460	170	5,460
2.....	1,550	566	44	276	44	184	1,144	5,160	7,210	5,810	170	5,810
3.....	1,489	566	44	276	44	214	1,144	6,670	8,310	5,460	170	5,460
4.....	1,489	1,270	93	276	124	214	8,264	6,670	6,670	5,220	390	5,220
5.....	1,611	1,058	44	214	154	214	8,264	6,670	5,160	4,810	275	5,240
6.....	1,611	648	566	276	124	308	7,586	7,750	6,670	4,410	170	5,020
7.....	1,611	566	781	214	308	410	5,872	76,470	7,750	4,810	75	5,020
8.....	1,650	689	735	214	342	449	6,670	35,970	6,670	4,810	170	5,240
9.....	1,611	648	648	214	276	342	5,690	23,970	6,670	5,920	275	5,240
10.....	1,550	566	566	214	214	410	5,160	15,730	6,670	4,220	170	4,810
11.....	1,256	566	449	214	214	527	5,160	12,760	7,210	4,030	1,690	4,810
12.....	781	607	488	154	154	566	5,690	13,460	6,930	4,410	7,210	4,410
13.....	829	566	410	214	154	566	5,460	34,470	6,930	4,410	5,220	4,810
14.....	829	566	342	154	184	566	5,240	32,420	7,480	4,810	5,220	4,810
15.....	829	566	342	154	184	566	5,240	32,420	7,480	4,810	5,220	4,810
16.....	878	566	410	154	154	929	5,590	128,970	7,210	2,250	4,810	4,410
17.....	827	566	449	98	154	1,144	6,410	100,470	7,750	1,850	10,120	4,030
18.....	735	607	488	154	154	1,088	6,670	56,970	7,750	1,590	5,160	4,410
19.....	827	488	410	98	154	1,088	8,600	37,470	9,500	1,160	5,240	4,030
20.....	735	566	376	154	244	1,144	9,500	24,720	10,120	975	5,020	4,030
21.....	827	488	342	154	244	1,144	9,500	55,470	10,120	725	5,240	4,030
22.....	689	488	410	154	276	929	7,750	14,560	10,120	510	10,760	3,500
23.....	735	488	410	154	276	929	7,750	18,000	9,500	390	10,760	2,840
24.....	735	276	410	154	342	1,370	7,210	17,500	8,990	175	5,210	2,890
25.....	735	276	410	154	342	1,370	7,210	17,500	8,990	175	5,210	2,890
26.....	781	276	410	154	342	1,370	31,470	14,190	8,990	175	8,310	1,790
27.....	735	184	342	98	342	1,980	28,470	13,460	8,310	170	5,690	1,360
28.....	607	98	342	98	410	1,034	9,190	10,760	6,930	170	5,020	1,160
29.....	566	...	342	98	342	929	8,890	8,890	5,160	170	5,240	1,160
30.....	566	...	376	98	214	1,034	7,210	8,030	5,160	220	4,810	975
31.....	566	...	276	...	214	...	7,210	7,210	...	...	...	725
Maximum..	1,611	1,370	781	342	449	1,370	37,470	131,470	10,120	5,920	11,080	5,690
Minimum..	566	98	44	98	44	184	1,144	5,160	7,750	75	75	725
Mean.....	1,025	555	384	180	221	724	8,811	32,267	7,701	2,600	4,172	3,808

Note.—Discharge determined from rating curves applicable as follows: July 8, 1921, to May 6, 1922, fairly well-defined below 10,000 second-liters; May 7, to December 31, 1922, fairly well-defined below 13,000 second-liters and above 1,000 second-liters.

*Daily and monthly discharges, in liters per second, of Santa Maria River near Poblacion, Santa Maria, Bulacan,  
for the year 1922*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	805	75	170	170	75	10,180	4,760	31,880	4,760	22,080	2,890	1,200
2.....	645	75	75	75	170	8,670	3,230	32,370	4,550	24,530	3,230	1,460
3.....	510	170	170	170	170	8,890	3,570	11,890	4,970	26,580	3,230	7,060
4.....	390	275	170	75	220	4,130	11,890	11,890	7,320	26,980	4,340	7,060
5.....	275	275	75	170	390	3,570	15,220	13,440	6,340	21,100	4,340	6,100
6.....	390	275	170	120	390	2,000	30,900	12,640	5,640	18,160	3,940	4,370
7.....	390	275	170	170	11,890	2,000	30,900	11,190	6,340	20,120	3,570	4,340
8.....	275	450	75	75	7,060	4,970	28,940	11,190	6,100	23,060	3,230	3,940
9.....	170	510	170	75	4,340	21,100	19,140	10,840	5,640	24,040	3,230	4,340
10.....	170	510	75	75	4,340	12,910	9,860	8,670	6,820	14,740	2,890	8,940
11.....	275	510	170	120	4,760	19,140	6,340	7,580	7,060	9,250	2,890	3,060
12.....	170	510	75	75	5,190	13,860	5,640	7,060	7,580	6,100	2,890	2,420
13.....	170	390	170	75	5,190	10,560	4,760	8,120	7,580	5,190	2,570	2,570
14.....	75	510	75	75	13,860	8,120	4,760	7,850	8,120	5,190	2,280	2,280
15.....	170	510	170	75	6,100	5,640	4,760	6,820	9,250	4,760	2,280	2,000
16.....	170	510	170	75	6,340	8,400	4,760	5,870	10,500	5,190	2,000	1,720
17.....	75	390	75	75	7,580	2,890	15,220	6,100	32,360	5,640	1,720	1,460
18.....	75	510	75	120	6,100	2,730	14,740	6,340	32,360	5,640	2,000	1,200
19.....	170	390	170	75	6,820	2,000	12,640	6,580	32,360	4,550	1,720	1,200
20.....	120	275	75	75	6,100	2,420	3,230	6,100	28,940	4,340	1,200	1,200
21.....	75	170	170	75	6,100	2,420	28,940	5,640	20,610	3,940	1,590	2,000
22.....	120	275	75	75	6,340	3,230	21,690	4,760	19,140	5,640	1,720	3,400
23.....	75	170	120	75	24,040	2,000	15,220	5,190	19,140	4,970	1,590	2,890
24.....	170	170	75	75	26,980	2,280	12,260	4,970	26,980	4,340	1,080	2,420
25.....	75	120	120	75	12,640	1,720	11,890	4,760	26,000	3,940	1,200	2,000
26.....	170	170	170	75	10,500	1,720	12,640	4,550	19,630	3,940	1,080	3,940
27.....	75	170	120	75	10,180	3,230	26,490	3,940	14,740	3,940	960	4,760
28.....	170	170	170	120	12,260	3,940	31,390	4,130	13,440	3,940	740	5,190
29.....	75	75	75	75	11,890	3,060	19,630	4,340	17,180	3,940	1,080	5,190
30.....	75	75	170	120	12,260	3,230	23,060	4,760	16,690	3,940	1,200	4,760
31.....	25	25	75	..	11,890	..	29,920	4,760	..	3,570	..	3,940
Maximum.	805	510	170	170	26,980	21,100	31,390	32,370	32,860	26,980	4,340	7,060
Minimum.....	25	75	75	75	75	1,720	3,230	3,940	4,550	3,570	740	1,200
Mean.....	213	315	125	92	7,812	6,211	15,050	9,207	13,946	10,435	2,316	3,355

NOTE.—See footnote to daily discharge table for 1921.



## CAGAYAN PROVINCE

### PANGUL RIVER, SOLANA

**LOCATION.**—On the steel truss bridge over the Pangul on the Solana-Piat Road, 7 km. from Solana and 13 km. from Tuguegarao.

**RECORDS AVAILABLE.**—From December 17, 1921, to December 16, 1922. Station established April 10, 1920. Only few current meter measurements made.

**GAGE.**—Standard metric gage board attached horizontally on the downstream side of the bridge. Chain and weight used for measuring gage heights.

**DISCHARGE MEASUREMENTS.**—Made from bridge.

**CHANNEL AND BANKS.**—Channel only one at low water stage but three would be formed at high water stage; straight for about 20 m. above and 30 m. below the station. Banks about 6 m. high, subject to overflow at extreme high water. Stream bed very soft and muddy. Flow rather sluggish.

**EXTREMES OF DISCHARGE.**—Maximum discharge during period of observation, 3,351 second-liters on September 29, 1922; minimum discharge, 44 second-liters on July 13, 1922.

**DIVERSIONS.**—None.

**REGULATION.**—None.

**UTILIZATION.**—For irrigation purposes.

**ACCURACY.**—Gage read twice daily. Record unreliable. Daily discharge roughly estimated.

*Discharge measurements of Pangul River, near Pangul, Solana, Cagayan*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1920</b>				
March 10 . .	W. Demers . .	35	343	. . . . .
<b>1922</b>				
March 10 . .	District Engineer . .	...	768	. . . . .
April 20 . . . .	M. Cruz and P. Libon .	50	168	. . . . .
September 28 . . . . .	District Engineer . .	...	2,000	. . . . .
November 6 . .	Tomas Lorenzo and P. Libon.	2.51	2,332	. . . . .



Daily and monthly discharges, in liters per second, of Pangul River near Pangul, Solana, Cagayan, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	157		118	100	275	704	109	2,284	162	1,930	179	1,915
2	157		118	127	118	1,235	72	3,001	224	2,162	168	1,223
3	157		100	127	118	1,735	84	3,051		2,777	168	
4	157		76	136	76		114	2,208	196	2,685	202	1,791
5	157		92	136	62		119	1,818	2,669	2,777		2,074
6	157		76	136	62		119	1,958	2,454	2,623		838
7	157		76	136	68		100	1,958	1,413	2,361		1,006
8	157		100	131	68		137	2,573	1,413			1,542
9	157		100	131	68		888	1,973	273	496		1,161
10	157		105	118	72		275	487		454		
11	196		100	109	109		179	269	2,016	438		2,162
12	196		105	127	92	202	127	422	2,777	1,987		3,267
13	196	114	92	122	344	174	100		2,808	2,777	168	3,201
14	157	105	84	118	382	2,423	68		2,700	2,423	478	2,638
15		109	100	114	250	2,935			2,423		2,515	1,973
16		109	76		779	2,654	88		2,469	1,006	3,101	1,941
17		109	76	114				190		1,542	2,952	
18		88	76	100	1,804	2,839	56	202	1,428	1,542	2,870	
19			76	84	1,858	2,531	44	190		1,295		
20		118	84	80	1,973	2,104	64	202		603		
21		127	256	92	2,016	2,823	56	2,345	478	557	2,669	
22		109	190	92	1,872	2,684	80	2,685	288	478	2,469	
23		96	168	157	1,438	2,689	127	2,685	262		2,208	
24		92	109	190	148	967	176	2,343	230	1,071	1,355	
25		92	109	157	100	1,365	68	2,343	230	493	512	
26		100	105	168	96	146	566	808	230	323		
27		118	105	162	96	167	470	406	224	269		
28			100	174	88	118	190	1,542	398	224	1,804	
29			96	168	84	92	157	1,071	2,623	196	2,602	
30			157	146	100	84	1,199	1,071	3,351		2,002	
31			127	146	336		750	207	3,035	196		
Maximum	196	127	256	237	2,016	2,935	1,199	3,051	3,351	2,777	3,101	3,267
Minimum	157	88	76	80	68	84	44	190	162	196	168	838
Mean	169	107	106	135	445	1,294	223	1,436	1,401	1,212	1,528	1,908

NOTE.—No record on days for which discharge is not given. Discharge determined from poorly defined rating curve.

## CAMARINES NORTE PROVINCE

### ALINAO RIVER, SAN VICENTE

LOCATION.—About 50 m. northeast of the San Vicente-Labo trail.

RECORDS AVAILABLE.—From January 1, 1921, to March 31, 1922.

GAGE.—Standard metric gage board vertically fastened to a tree on the left bank of the river.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND BANKS.—Channel splits into two at extremely high water stage; straight for about 20 m. above and 30 m. below the station. Bed of stream sandy and gravelly. Left bank, high and covered with brushes; right banks low, sandy, and gravelly and covered with grass.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 15,106 second-liters on November 10, 1921; minimum discharge, 198 second-liters on June 30, 1921.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Gage read twice daily. Daily discharge determined from well-defined curve. Records good below 4,600 second-liters.

### *Discharge measurements of Alinao River, near Alinao, San Vicente, Camarines Norte*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1921</b>				
January 24	Buch. and Musa	58	627	
March 10	Musa	80	1,937	
April 14	O. B. and Buch	48		
June 6	Musa	40	175	
July 27	do	44	433	
August 16	do	41	146	
September 9	do	39	181	
October 25	O. B. and S. Musa	95	2,948	
November 27	O. Buenaventura	95	2,966	
December 2	do	90	2,706	
December 21	do	90	2,599	
December 22	S. Musa	85	1,852	
<b>1922</b>				
January 13	do	80	1,681	
January 14	do	70	1,335	
January 16	do	62	1,090	
January 17	do	60	865	
February 21	do	60	1,075	
February 24	do	53	975	
March 17	O. B. and S. Musa	60	1,216	
March 18	do	54	803	

*Daily and monthly discharges, in liters per second, of Atinao River near Alinao, San Vicente, Camarines Norte,  
for the year 1921*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	2,546	9,506	2,609	1,017	356	298	222	272	326	1,203	3,486	3,071
2	2,483	2,237	2,177	974	326	272	222	326	298	1,017	5,160	1,939
3	2,298	2,177	1,824	888	272	272	1,497	272	326	1,203	8,246	2,359
4	1,768	11,606	1,603	858	298	298	8,106	298	246	1,299	8,946	10,206
5	1,824	3,071	1,343	974	272	272	2,673	272	272	1,497	5,586	4,466
6	1,838	2,867	2,237	1,497	272	272	1,002	272	272	1,107	6,366	2,768
7	1,338	1,338	3,756	724	272	272	1,530	272	272	1,203	9,646	1,988
8	1,497	3,139	2,586	804	272	272	530	272	298	1,299	10,906	2,117
9	1,447	2,737	2,546	644	272	272	356	272	272	1,299	15,106	1,656
10	1,974	2,298	1,988	974	272	272	530	272	1,348	5,586	4,746	1,497
11	974	1,880	1,397	568	272	272	880	222	7,406	5,306	4,676	2,177
12	1,017	1,998	1,497	568	272	272	386	222	2,421	4,466	2,298	2,298
13	1,155	1,603	1,348	530	272	272	386	222	2,935	4,326	3,976	3,976
14	2,237	1,603	2,421	492	272	272	606	246	846	1,497	4,186	3,626
15	4,046	1,155	4,256	492	272	272	568	222	530	1,203	4,816	3,139
16	2,177	1,107	4,186	454	272	246	530	222	272	1,062	4,746	2,802
17	1,550	2,298	5,586	454	246	246	530	246	272	1,155	4,606	2,421
18	1,768	2,359	3,906	492	272	272	568	222	272	814	2,496	2,496
19	1,397	4,606	2,609	454	272	272	492	246	272	684	1,768	2,177
20	1,497	2,586	2,586	492	272	272	356	272	272	1,017	14,456	2,483
21	1,974	2,098	1,824	420	272	272	356	272	272	5,656	14,406	2,935
22	1,203	2,098	1,824	420	272	272	356	272	272	7,056	13,146	3,975
23	888	2,867	1,656	454	272	272	356	272	386	6,426	12,236	6,006
24	804	16,906	1,447	386	272	420	298	222	454	3,486	8,106	8,106
25	386	3,836	1,447	356	272	222	326	222	386	3,346	4,536	3,906
26	931	3,139	1,348	326	272	222	326	272	530	3,416	3,139	3,003
27	724	2,609	1,299	492	298	222	326	272	1,299	3,207	3,207	2,298
28	5,656	1,107	386	326	246	222	326	272	764	3,207	3,207	2,177
29	3,486	3,486	931	326	272	198	272	272	3,766	3,406	15,106	10,206
30	6,356	11,606	5,656	1,251	356	420	8,106	326	7,406	7,056	1,497	1,497
31	1,925	1,107	931	356	272	198	856	222	246	2,439	6,664	3,198
		3,697	2,291	622	272	231	856	231	867			
Maximum	6,356	11,606	5,656	1,251	356	420	8,106	326	7,406	7,056	15,106	10,206
Minimum	2,483	1,107	931	356	272	198	856	222	246	2,439	6,664	3,198
Mean	1,925	3,697	2,291	622	272	231	856	231	867			



## CAMARINES NORTE PROVINCE

## BICAL RIVER, LABO

LOCATION.—In the northerly direction from San Vicente and about 200 m. below the San Vicente-Labo trail.

RECORDS AVAILABLE.—From January 1, 1921, to December 31, 1922.

GAGE.—Standard metric gageboard vertically fastened to a tree on the left bank of the river.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND BANKS.—One channel at all stages; straight for 100 m. above and below the station. Bed of stream gravelly. Left bank high and of earthy texture; right bank low and covered with vegetation.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 589,000 second-liters on October 23, 1921; minimum discharge, 245 second-liters from August 30 to September 8, 1922.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Roughness of bed due to gravels and boulders affect the discharge measurements and trees and brush on the right bank cause cessation of flow sometimes. Record from January 1, 1921, to March 31, 1921, may be in error due to poor observations made during this period. Records good below 16,500 second-liters. Gage read twice daily.

*Discharge measurements of Bical River, near Bical, Labo, Camarines Norte*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1921</b>				
January 24..	Buch and Musa.	.87	796	
March 10	S. Musa.	.95	2,160	
April 14..	O. B. and Buch	.90	582	
April 25..	S. Musa..	.80	586	
June 7..	do.	.81	469	
July 26.	do.	.82	495	
August 10.	do.	.70	464	
September 9	do.	.68	303	
October 25.	do.	.99	2,592	
November 28	O. B.	1.04	3,367	
December 3	do.	.95	2,165	
December 21	do.	1.02	4,075	
December 22	do.	.97	2,720	
<b>1922</b>				
January 13	S. Musa..	.97	2,870	
January 14..	do.	.94	2,498	
January 16..	do.	.92	1,476	
January 17.	do.	.91	1,502	
February 21	do.	.91	1,001	
February 22..	do.	.90	984	
February 23..	do.	.88	811	
March 17	do.	.94	1,646	
March 18..	O. B. and Musa.	.92	1,385	
April 20..	do.	.87	530	
April 21..	do.	.85	484	
May 9..	do.	.82	408	
May 11..	do.	.83	419	
May 12..	do.	.83	416	
May 13..	do.	.82	424	
June 30..	do.	.85	650	
July 8..	O. Buenaventura	.88	824	
July 26.	do.	.83	475	
August 15	do.	.80	352	
August 18..	do.	.80	268	
September 5	do.	.75	317	
September 8	do.	.78	378	
October 17..	do.	.95	1,551	
November 7.	do.	.93	1,462	
December 25	do.	1.24	3,866	

Daily and monthly discharges, in liters per second, of Eical River near Labo, Camarines Norte, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	1,814	19,040	2,000			556	446	396	500	446	4,060	1,290
2	9,680	20,400	934			1,030	500	396	446	446	8,270	6,810
3	20,400	4,378	844		353	1,136	5,610	396	446	1,136	10,070	39,340
4		249,000	844		353	1,500	8,960	396	446	934	122,420	70,160
5	2,856	5,610	844		312	500	9,680	396	446	763	39,340	8,270
6		4,024	1,136		312	500	1,250	353	446	763	6,160	4,060
7	1,136	25,100	5,610		312	446	1,136	312	446	618	33,980	2,950
8	1,136	16,480	2,856		312	446	1,136	312	446	618	87,580	2,630
9	1,136	3,393	2,620		276	396	1,136	396	312	446	82,220	1,645
10	1,250	2,856	2,000		276	396	934	396	1,503	446	63,460	1,460
11	396	1,503	1,814		396	396	1,136	396	3,393	1,370	63,460	1,460
12	1,136	844	1,814		396	446	1,136	618	1,250	2,400	2,950	1,460
13	1,136	1,250	1,650		396	446	934	1,030	1,370	1,370	2,630	1,290
14	1,250	1,370	1,503		396	500	763	396	1,650	1,250	2,630	60,780
15	1,136	1,136	2,856		396	500	763	353	763	1,650	1,850	20,580
16	2,000	1,136	6,603		446	446	618	353	844	618	2,835	3,640
17	1,250	1,136	6,603		396	396	556	396	556	618	2,630	8,290
18	1,250	1,650	21,900		396	396	618	396	446	618	1,645	2,630
19	1,136	5,610	4,024		396	353	763	396	396	500	1,460	1,645
20	1,136	941,200	2,856		396	353	686	353	396	556	21,290	1,645
21	1,136	48,800	2,400		446	396	686	353	396	556	60,780	2,630
22	1,136	3,700	1,136		446	353	618	353	396	556	123,260	2,950
23	1,136	3,112	934		446	396	556	353	353	58,000	151,500	3,290
24	618	8,950	844		396	4,024	556	312	312	2,172	151,500	3,290
25	844	223,000	763		500	763	618	312	686	2,856	137,680	23,260
26	934	40,200	763		446	618	556	312	3,100	2,856	20,580	6,160
27	763	2,856	844		500	500	500	312	2,196	2,856	6,810	10,070
28	844	686	686		446	446	500	312	3,503	2,763	4,490	3,660
29	1,136	2,620	2,196		446	446	446	312	3,112	1,650	1,290	2,630
30	6,085		618		446	446	446	312	556	2,856	1,020	2,335
31	45,800		618		446	446	396	446		90,360		1,850
Maximum	45,800	941,200	21,900		500	4,024	9,680	1,030	3,700	589,000	151,900	70,160
Minimum	396	844	618		276	353	396	312	312	446	1,320	1,290
Mean	3,697	58,584	2,681		396	619	1,423	391	348	23,195	30,356	9,150

NOTE.—No record on days for which discharge is not given.



Daily and monthly discharges, in liters per second, of Bical River near Bical, Labo, Camarines Norte, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1. . . . .	1,645	900	1,645	700	980	420	620	700	245	550	1,460	2,950
2. . . . .	1,280	1,850	1,460	700	420	370	1,020	550	245	420	2,335	2,950
3. . . . .	1,280	1,460	1,280	700	420	370	900	550	245	420	2,950	2,335
4. . . . .	1,280	1,460	1,145	620	420	580	700	1,020	245	420	2,335	52,740
5. . . . .	1,280	1,850	1,145	620	420	480	700	1,850	245	420	2,950	32,640
6. . . . .	1,145	1,645	900	550	420	420	620	1,795	245	420	2,335	4,490
7. . . . .	1,145	1,460	795	550	420	370	620	245	245	420	2,335	4,490
8. . . . .	1,145	1,280	900	550	420	325	550	620	245	420	2,335	3,650
9. . . . .	1,145	1,145	1,020	620	480	325	420	420	325	1,850	1,850	3,290
10. . . . .	1,020	1,145	795	700	480	325	420	420	325	1,460	1,850	3,650
11. . . . .	1,145	1,020	700	620	550	325	420	370	325	2,335	1,850	4,970
12. . . . .	2,070	900	620	1,145	550	325	420	325	325	2,335	1,850	3,650
13. . . . .	3,290	1,020	1,460	900	700	1,020	420	325	325	2,335	1,850	2,950
14. . . . .	1,850	795	1,850	620	480	1,460	325	325	325	2,335	1,850	2,950
15. . . . .	1,460	700	1,460	550	480	1,020	325	325	325	2,335	1,850	2,950
16. . . . .	1,460	700	2,335	550	480	1,460	325	325	325	2,335	1,850	2,950
17. . . . .	1,020	620	1,460	620	420	1,460	325	325	325	2,335	1,850	2,950
18. . . . .	1,345	700	1,460	550	480	1,460	325	325	325	2,335	1,850	2,950
19. . . . .	1,900	700	1,280	700	420	1,460	420	325	325	2,335	1,850	2,950
20. . . . .	1,280	1,850	1,460	700	420	1,460	420	325	325	2,335	1,850	2,950
21. . . . .	1,280	1,460	1,460	700	550	1,145	550	325	325	2,335	1,850	2,950
22. . . . .	1,280	1,460	1,145	550	550	1,145	420	325	325	2,335	1,850	2,950
23. . . . .	1,145	900	1,020	550	550	1,145	420	325	325	2,335	1,850	2,950
24. . . . .	1,900	795	1,280	700	550	900	550	280	4,490	1,460	1,460	8,270
25. . . . .	1,900	620	1,145	550	550	700	550	245	2,950	1,460	1,850	3,650
26. . . . .	1,145	550	1,145	550	550	700	550	245	1,145	1,020	1,850	12,540
27. . . . .	1,280	480	2,335	550	480	420	620	245	900	1,460	17,900	25,940
28. . . . .	1,020	550	1,645	550	480	325	620	325	900	1,145	9,120	8,270
29. . . . .	900	.....	1,280	480	420	325	700	245	700	1,460	20,560	4,490
30. . . . .	795	.....	1,020	480	420	1,460	620	325	550	25,940	16,560	4,490
31. . . . .	795	.....	1,020	480	420	1,145	900	245	620	2,950	4,490	9,120
Maximum	3,290	1,850	2,950	1,145	700	1,645	1,020	1,850	4,490	25,940	24,600	110,360
Minimum	795	480	620	420	420	325	325	450	245	420	620	2,335
Mean	1,280	1,059	1,321	624	480	710	572	450	651	2,217	4,428	13,890

## CAMARINES NORTE PROVINCE

## DAET RIVER, DAET

LOCATION.—About 100 m. below the junction of Mananap, Maisog, and Daet Rivers and 1 km. above location of old Spanish dam.

RECORDS AVAILABLE.—From January 1, 1921, to December 31, 1922.

GAGE.—Standard metric gage board vertically set on the right bank of the river.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND BANKS.—One channel at all stages; straight for 50 m. above and below station. Right bank high covered with abaca and coconut trees; left bank low and subject to overflow. Bed of stream gravelly and sandy.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 258,100 second-liters on December 31, 1922; minimum discharge, 800 second-liters on August 29–30, 1922.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Record fair. Roughness of bed and poor location of station may greatly affect gaging. Gage read twice daily.

*Discharge measurements of Daet River, near Mancalpe, Daet,  
Camarines Norte*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1921</b>				
January 15..	S. M. Musa	.62	6,055	
January 27..	do.	.62	7,678	
January 31..	do.	2 73	107,586	
February 1..	do.	2 86	128,443	
February 12..	do.	.80	12,131	
April 15..	do.	.63	3,776	
May 9..	do.	.59	3,279	
June 9..	do.	.54	3,045	
July 28..	do.	.54	3,221	
August 17..	do.	.52	2,341	
September 10..	do.	.55	3,302	
October 23..	do.	.97	15,505	
November 23..	do.	1 77	85,076	
<b>1922</b>				
January 11..	do.	1 15	10,740	
January 18..	do.	1 16	9,493	
January 19..	do.	1 14	8,747	
January 20..	do.	1 15	9,014	
January 21..	do.	1 14	8,372	
February 21..	do.	1 05	6,347	
February 24..	do.	1 05	5,688	
February 25..	do.	1 05	6,026	
February 27..	do.	1 07	7,006	
March 20..	do.	1 16	7,773	
April 22..	do.	.97	4,673	
April 24..	do.	.93	3,827	
May 9..	do.	.88	2,901	
May 11..	do.	.92	3,590	
May 12..	do.	.96	4,582	
May 15..	do.	.94	4,267	
June 12..	Demers, Musa, and O. B	.84	2,406	
June 29..	O. Buenaventura..	.89	4,738	
July 1..	do.	.91	5,498	
July 25..	do.	.82	4,966	
August 14..	do.	.74	2,495	
August 17..	do.	.74	2,432	
September 4..	do.	.68	2,080	
September 7..	do.	.74	2,289	
October 16..	do.	.88	7,257	
November 6..	do.	1 00	8,985	

Daily and monthly discharges, in liters per second, of Daet River near Daet, Camarines Norte, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	10,400	96,120	16,320	10,120	3,500	3,500	3,500	1,605	3,165	7,020	19,840	
2	13,580	33,640	14,240	9,450	3,330	3,870	4,055	1,605	2,295	6,235	14,880	
3	11,020	24,980	17,760	9,120	3,045	3,685	4,055	1,405	3,870	4,615	13,570	
4	12,940		13,260	8,180	3,600	4,245	34,270	1,405	4,245	14,000	12,350	
5	12,620		13,260	8,180	3,330	3,870	7,300	1,225	3,330	10,120	10,830	
6	9,800		18,840	7,500	3,165	3,600	5,515	1,605	6,490	7,020	22,640	
7	10,700		17,760	7,300	3,165	3,600	5,065	1,605	5,745	4,645	20,940	
8	10,400		14,240	6,490	3,165	3,330	4,845	1,405	5,515	6,965	17,760	
9	10,400		12,620	5,985	3,330	3,165	4,055	2,560	5,745	2,560	17,760	
10	12,940		11,380	6,490	3,165	2,850	3,870	2,560	10,120	12,350	32,720	
11	8,800		27,060	4,055	3,165	2,560	3,500	1,535	10,120	12,350	11,380	
12	8,280		27,060	3,870	3,165	2,560	3,165	1,605	13,140	15,800	14,880	
13	7,280		29,980	3,685	3,165	3,165	2,150	1,405	5,985	7,580	10,120	
14	13,580	15,600	78,300	3,685	3,165	3,685	3,005	1,815	10,120	7,580	7,020	
15	34,760	11,660	15,800	3,370	3,870	3,885	3,165	1,605	8,800	3,330	7,020	
16	17,040	11,660	20,940	3,500	3,600	3,870	2,850	1,405	6,490	2,560	11,200	
17	12,300	11,980	22,640	3,500	3,165	3,500		1,930	9,450	1,930	10,830	
18	10,700	17,040	12,350	3,500	3,005	3,165	2,705	1,815	6,490	3,500	10,120	
19	9,200	34,300	13,140	3,500	3,005	3,165	3,165	1,605	6,490	4,645	12,350	
20	20,000	36,600	12,350	3,500	3,005	2,560	2,560	1,405	2,425	3,870	14,880	
21	8,080	46,500	11,370	3,500	3,005	2,560	2,560	1,605	1,815	10,120	14,000	
22	7,580	18,480	9,450	3,500	3,005	2,560	2,560	1,405	5,290	15,800	19,300	
23	7,020	14,920	10,470	3,500	3,005	2,560	2,045	1,605	4,245	64,360	17,480	
24	6,500	60,160	10,120	3,500	3,005	2,560	2,295	3,255	4,245	15,140	117,480	
25	7,280	11,300	3,450	3,500	3,005	2,560	2,560	3,255	4,245	15,140	237,820	
26	6,280	17,040	10,470	3,500	3,005	2,560	2,560	3,330	27,760	15,800		
27	21,200		10,120	3,870	3,005	2,560	2,705	5,065	9,450	14,000		
28	28,040		8,800	3,870	3,005	2,560	2,560	4,645	17,760	13,140		
29			9,450	3,870	3,005	2,560	2,425	5,065	19,300	8,800		
30			8,800	3,870	3,870	2,045	1,605	5,065	14,880	7,580		
31					3,685			7,020				
Maximum	73,000	96,120	78,300	10,120	3,870	5,290	34,270	7,020	27,720	64,360	237,820	
Minimum	6,260	11,660	8,800	3,500	2,045	2,045	1,605	1,225	1,815	1,930	7,020	
Mean	13,769	29,162	17,215	5,130	3,178	3,180	4,352	2,338	8,335	10,862	32,400	

Note.—No record on days for which no discharge is given. Discharge determined from fairly well-defined curve.

Daily and monthly discharges, in liters per second, of Daet River near Daet, Camarines Norte, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.		8,060	25,960	7,230	3,120	3,270	3,270	3,910	1,700	7,930	12,030	18,400
2.		22,160	9,660	6,730	2,700	2,980	2,700	8,370	1,500	4,790	10,680	15,520
3.		13,440	9,000	6,260	2,560	2,420	2,700	4,260	1,900	4,790	15,010	17,200
4.		11,040	9,000	5,810	2,560	2,420	2,700	1,790	2,300	4,230	19,640	12,990
5.		49,520	8,370	5,400	2,700	6,030	2,980	2,980	2,520	4,790	12,030	78,700
6.		12,560	8,060	5,400	2,700	4,080	2,980	7,230	3,710	4,230	12,030	68,950
7.		9,660	7,770	4,620	2,560	3,910	2,980	4,260	3,710	4,230	9,450	23,980
8.		9,660	7,230	4,620	2,700	4,620	2,840	3,580	7,930	4,230	12,030	23,980
9.		9,000	7,230	4,440	2,980	4,260	2,560	2,980	7,240	12,990	12,500	21,650
10.		8,370	6,730	4,260	3,420	3,910	2,700	2,700	3,710	13,990	12,500	12,990
11.	9,000	9,000	6,260	4,620	3,580	3,420	2,700	2,560	3,210	21,650	12,030	11,560
12.	44,560	8,370	6,260	4,810	3,910	2,420	2,700	2,560	3,210	12,990	12,030	20,940
13.	21,000	8,060	5,810	4,620	3,270	2,420	2,560	4,230	3,460	25,590	12,030	12,030
14.	18,580	7,500	6,260	9,000	3,270	2,290	2,700	3,710	3,710	12,030	11,110	12,030
15.	14,370	6,730	9,660	7,230	3,910	2,290	2,980	3,960	3,210	8,670	9,840	11,110
16.	12,160	6,260	9,000	5,200	3,580	2,290	2,700	3,710	3,210	7,240	6,600	32,780
17.	9,000	5,810	8,680	4,260	3,120	2,980	2,840	3,710	3,210	6,600	6,670	20,940
18.	8,370	5,000	8,680	4,260	2,980	4,260	3,270	3,710	3,710	7,930	6,970	23,980
19.	9,000	23,480	8,680	3,910	2,980	2,980	2,980	3,460	4,230	12,030	10,680	121,600
20.	9,000	6,260	8,370	3,580	3,580	3,910	2,700	3,460	4,790	11,110	7,240	182,050
21.	8,370	6,260	8,370	4,260	3,580	3,910	2,980	3,210	12,990	11,560	5,990	221,050
22.	9,000	6,730	8,370	4,260	4,440	3,270	2,980	2,750	7,930	10,250	17,200	15,520
23.	8,370	6,260	8,060	4,260	11,780	3,120	3,270	2,300	10,250	8,670	12,200	13,990
24.	8,370	6,260	7,770	3,910	9,660	2,840	4,260	2,100	29,960	7,240	12,030	48,720
25.	9,320	6,030	7,770	3,580	6,730	2,420	2,560	1,900	11,110	6,600	10,250	32,780
26.	8,370	11,040	8,370	3,580	5,810	2,560	2,560	1,500	7,930	6,290	17,200	20,940
27.	9,000	6,260	10,000	3,580	5,200	2,420	5,000	1,140	15,520	10,250	36,850	19,640
28.	8,370	6,260	9,000	2,420	4,620	2,420	4,260	960	12,030	12,990	32,780	48,720
29.	8,370	...	8,680	1,910	4,260	3,120	3,120	800	12,030	9,450	176,200	23,980
30.	8,370	...	8,370	1,910	3,910	3,580	2,980	800	9,450	11,110	17,200	30,890
31.	8,370	...	7,770	...	3,420	...	3,580	1,500	...	11,110	...	258,100
Maximum	44,560	49,520	25,960	9,000	11,780	6,030	5,000	8,370	176,200	25,590	176,200	258,100
Minimum	2,990	5,000	5,810	1,910	2,560	2,290	2,560	800	1,500	4,230	5,990	11,110
Mean	12,062	10,911	8,694	4,685	4,027	3,202	3,045	3,100	9,150	9,599	18,916	47,668

NOTE.—See footnote to discharge table for 1921.

## CAMARINES NORTE PROVINCE

## LABO RIVER, LABO

LOCATION.—Northeast of the town of Labo and about 300 m. below the provincial road.

RECORDS AVAILABLE.—From January 1, 1921, to May 31, 1922.

GAGE.—Standard metric gage board on the left bank of the river.

DISCHARGE MEASUREMENTS.—Made by wading at low and from boat at high water stage.

CHANNEL AND BANKS.—Channel splits into two at high water stage. Rapids 50 m. below and straight for 1 km. above the station. Bed of stream gravelly and sandy. Right bank high and left bank low; both covered with vegetation.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 611,500 second-liters on November 26, 1921; minimum discharge, 7,350 second-liters on January 28, 1921.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Gage read twice daily. Roughness of river bed affect discharge measurements. At high water stage no place for good discharge measurements due to formation of rapids. Record good below 10,000 second-liters; for higher stages records may be considerably in error.

*Discharge measurements of Labo River, near Malasugue, Labo,  
Camarines Norte*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1921</b>				
April 13.....	O. B. and Buchanan	.02	25,668	..
June 8.....	S. Musa. ....	.12	19,134	..
July 25.....	.. do. ....	.32	18,882	..
August 15 ..	.. do. ....	.25	17,088	..
<b>1922</b>				
March 22 ..	.. do. ....	.34	22,050	..
April 21....	.. do. ....	.30	30,070	..
May 10.....	.. do. ....	.27	27,122	..

Daily and monthly discharges, in liters per second, of Labo River near Malasugue, Labo, Camarines Norte, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1..	19,825	101,500	38,050			17,075	12,450	17,625	29,525	61,500	46,050	63,500
2..	20,925	56,650	30,875			17,825	11,475	16,550	23,225	46,350	186,500	64,500
3..	30,875	39,600	20,925			17,075	15,500	26,950	23,225	46,350	186,500	64,500
4..	30,875	91,500	17,075			19,825	591,500	18,175	27,375	43,500	244,500	131,500
5..	30,875	47,750	20,925			17,075	156,500	16,550	27,375	43,500	244,500	131,500
6..	32,250	32,250	22,675			14,450	15,500	15,500	30,875	22,675	112,500	68,500
7..	26,950	91,500	191,500			10,525	43,550	14,450	29,525	30,875	68,500	68,500
8..	19,825	61,500	61,500			10,525	38,050	15,500	35,050	24,475	54,800	58,550
9..	19,825	66,500	43,550			11,475	39,600	14,450	28,225	22,075	556,500	54,800
10..	25,700	32,250	32,250			11,475	35,775	30,875	27,375	26,950	361,500	58,550
11..	19,825	32,250	28,850			12,450	20,925	18,725	271,500	106,500	196,500	47,750
12..	22,075	26,950	28,850			10,525	33,850	16,550	136,500	96,500	151,500	46,050
13..	23,275	35,775	24,475			15,500	23,850	14,975	31,550	65,500	136,500	47,750
14..	21,500	25,700	22,675			18,725	25,700	14,450	23,325	61,500	128,500	386,500
15..	22,075	19,825	58,550			18,725	25,075	17,625	25,700	54,800	98,500	142,500
16..	101,500	22,675	106,500			35,775	24,475	15,500	22,075	64,500	60,500	106,500
17..	54,800	20,975	116,500			26,950	29,525	15,500	22,075	64,500	64,500	86,500
18..	30,875	17,075	86,500			19,825	32,250	15,500	28,225	44,375	74,500	70,500
19..	38,050	35,775	106,500			19,825	32,250	14,975	28,225	45,200	128,500	70,500
20..	24,475	161,500	61,500			23,875	23,075	13,450	28,225	47,750	35,775	62,500
21..	19,825	126,500	61,500			23,875	23,075	11,950	30,875	47,750	356,500	87,500
22..	24,475	166,500	33,850			20,925	22,675	11,950	28,225	261,500	386,500	72,500
23..	24,475	166,500	33,850			18,725	23,875	11,950	32,525	246,500	396,500	74,500
24..	28,850	32,250	22,675			18,725	23,875	11,475	32,525	126,500	214,500	136,500
25..	18,700	171,500	22,675			22,075	20,375	11,475	32,525	126,500	214,500	136,500
26..	11,950	266,500				22,075	20,375	11,475	136,500	141,500	321,500	118,500
27..	9,600	78,500				18,725	19,825	11,475	124,500	131,500	144,500	92,500
28..	7,350	43,550				18,725	18,725	17,625	124,500	131,500	144,500	92,500
29..	19,825					18,175	17,625	17,625	124,500	131,500	144,500	92,500
30..	33,650					16,550	18,175	30,200	128,500	128,500	116,500	74,500
31..	47,750					13,950	17,075	30,200	92,500	161,500	74,500	66,500
Maximum..	101,500	266,500	191,500			47,750	591,500	32,250	271,500	261,500	611,500	336,500
Minimum..	7,350	17,075	17,075			9,600	11,475	11,475	22,075	22,075	35,775	46,050
Mean.....	27,140	68,815	52,362			18,873	48,579	17,055	50,107	80,199	179,266	97,902

NOTE.—Records from March 26, 1921, to May 31, 1921, unreliable.

Daily and monthly discharges, in liters per second, of Labo River near Malasugue, Labo, Camarines Norte, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.	60,500	29,525	42,750	20,925	23,275							
2.	53,900	58,550	25,700	19,825	32,250							
3.	53,900	41,150	22,075	18,175	33,650							
4.	58,550	32,250	20,925	16,550	20,925							
5.	54,800	60,500	19,825	16,550	18,725							
6.	42,750	48,825	18,725	15,500	18,725							
7.	40,375	42,750	17,625	15,500	18,175							
8.	38,825	36,525	16,550	16,550	15,500							
9.	36,525	30,875	16,550	16,550	24,475							
10.	36,525	28,225	19,275	22,075	46,050							
11.	41,150	28,225	22,075	28,850	25,700							
12.	155,500	26,950	20,375	22,875	20,925							
13.	131,500	25,700	24,475	20,925	18,725							
14.	64,500	24,475	58,550	19,825	16,175							
15.	62,500	23,275	52,125	21,500	17,625							
16.	59,525	23,275	38,050	18,175	54,475							
17.	39,600	22,075	56,550	16,550	23,275							
18.	36,525	20,925	43,550	16,550	23,275							
19.	36,525	39,825	33,650	16,550	18,825							
20.	42,150	23,275	23,825	16,725	16,550							
21.	33,650	22,075	30,875	16,550	17,625							
22.	33,650	22,075	30,875	23,875	30,200							
23.	32,950	23,275	23,700	18,725	32,950							
24.	35,775	22,075	24,475	15,500	29,525							
25.	32,250	18,725	23,275	16,550	20,925							
26.	29,525	19,825	26,950	18,725	20,925							
27.	35,050	18,725	38,050	17,625	29,525							
28.	46,900	17,625	30,875	17,625	25,700							
29.	39,600	.....	25,075	18,725	19,825							
30.	35,050	.....	23,275	18,725	19,825							
31.	26,950	.....	22,075	.....	16,550							
Maximum.	155,500	60,500	58,550	28,850	46,050							
Minimum.	17,625	17,625	16,550	15,500	15,500							
Mean.	49,338	29,362	28,902	18,669	23,240							

## CAMARINES NORTE PROVINCE

## MATOGDON RIVER, LABO

LOCATION.—About 30 m. above the Matogdon-Labo trail.

RECORDS AVAILABLE.—From January 29, 1921, to August 5, 1922.

GAGE.—Standard metric gage board vertically fastened to a tree on the left bank of the river.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND BANKS.—One channel at all stages; straight for 40 m. above and 30 m. below station. Bed of stream gravelly at the station and below plenty of boulders. Both banks low and covered with vegetation.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 69,630 second-liters on November 9, 1921; minimum discharge, 220 second-liters on June 20–22, 1921.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Gage read twice daily. Daily discharge determined from fairly well-defined rating curves. Record fair below 15,000 second-liters and those below 1,000 second-liters may probably be in error due to no discharge measurement made during low water. Fish dams sometimes put up near station and the approximity of the station to the junction of the two branches affect measurements.

*Discharge measurements of Matogdon River, near Matogdon, Labo,  
Camarines Norte*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1921</b>				
January 24. . . . .	Buchanan and Musa.	67	2,880	
March 10. . . . .	Musa.	78	6,788	
April 14. . . . .	O. B. and Buchanan	68	3,082	
April 25. . . . .	S. Musa	67	2,371	
June 7. . . . .	do.	55	1,601	
July 26. . . . .	do.	54	2,452	
August 16. . . . .	do.	55	1,546	
September 9. . . . .	do.	55	1,544	
October 26. . . . .	do.	88	10,338	
November 28. . . . .	do.	83	9,929	
December 3. . . . .	do.	79	8,199	
December 21. . . . .	O. B.	76	5,467	
December 22. . . . .	do.	79	6,280	
<b>1922</b>				
January 16. . . . .	S. Musa	68	4,340	
January 17. . . . .	do.	66	4,217	
February 22. . . . .	do.	66	2,717	
February 23. . . . .	do.	63	2,397	
March 18. . . . .	do.	66	2,484	
April 20. . . . .	do.	65	1,474	
April 21. . . . .	do.	64	1,326	
May 9. . . . .	do.	60	1,273	
May 11. . . . .	do.	60	1,245	
May 12. . . . .	do.	60	1,305	
May 13. . . . .	do.	62	1,360	
June 30. . . . .	do.	60	1,320	
July 3. . . . .	O. B.	64	1,804	



Daily and monthly discharges, in liters per second, Matogodon River near Matogodon, Labo, Camarines Norte, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....		7,160	1,910	1,280	2,370	2,020	1,480	1,280	1,580	1,690	1,450	4,790
2.....		3,410	1,910	2,370	2,370	2,370	1,480	1,480	1,580	1,690	8,545	4,140
3.....		6,760	3,130	1,280	2,430	1,800	1,480	1,580	1,480	2,130	2,730	3,530
4.....		1,280	1,280	1,320	2,430	1,910	1,480	1,480	1,480	1,800	21,570	25,350
5.....		1,910	4,610	2,910	2,430	1,910	1,480	1,580	1,480	1,480	8,545	12,390
6.....		1,280	4,610	2,130	1,280	1,910	2,370	1,580	1,480	1,480	2,985	9,420
7.....		6,760	1,280	1,480	1,480	1,690	2,020	1,580	1,480	1,480	5,825	7,725
8.....		12,030	1,280	1,280	1,280	2,130	2,130	1,480	1,690	1,580	5,825	3,985
9.....		4,610	4,610	1,280	1,280	1,910	2,370	1,910	1,580	1,480	69,530	2,985
10.....		3,410	3,690	2,370	1,280	2,130	1,910	1,480	1,690	1,480	63,150	2,985
11.....		2,410	3,690	2,370	1,280	2,130	1,910	1,480	8,440	2,870	9,420	2,485
12.....		1,280	3,130	3,610	1,480	2,130	1,910	1,480	2,870	1,690	5,825	2,255
13.....		1,910	3,130	3,130	1,280	2,370	1,910	1,480	2,250	1,690	4,790	6,940
14.....		1,910	3,130	2,370	1,190	2,370	1,910	1,480	1,690	1,690	3,245	13,470
15.....		1,590	4,610	2,370	1,010	920	1,910	1,480	1,580	1,580	2,485	8,545
16.....		2,370	3,980	1,690	2,130	740	2,020	1,480	1,580	1,580	2,485	8,980
17.....		1,910	6,760	1,910	1,690	450	1,910	1,480	1,580	1,480	2,370	7,320
18.....		4,610	5,810	2,610	2,370	590	2,020	1,480	1,580	1,480	2,370	5,470
19.....		3,130	4,610	2,020	1,680	450	4,290	1,480	1,580	1,690	2,985	5,470
20.....		1,690	4,610	2,370	1,910	220	1,910	1,480	1,480	1,690	2,985	5,470
21.....		3,690	3,690	2,370	1,690	220	1,800	1,480	1,480	1,690	2,985	5,470
22.....		5,280	2,020	2,740	1,280	330	1,690	1,480	1,480	1,690	68,550	6,135
23.....		3,410	1,690	2,370	1,690	330	1,690	1,480	1,480	36,150	22,110	5,470
24.....		5,280	1,010	3,130	2,020	390	1,690	1,380	1,480	36,150	14,550	5,470
25.....		11,460	4,650	2,740	1,690	390	1,690	1,380	1,480	2,985	48,570	24,270
26.....		4,610	1,280	2,020	2,130	920	1,580	1,280	1,910	8,545	41,550	19,410
27.....		3,130	1,100	2,610	1,690	1,100	1,480	1,280	5,280	4,140	8,545	14,010
28.....		2,610	920	2,490	2,020	920	1,480	1,480	2,130	2,985	8,545	6,940
29.....	4,770		1,280	1,690	2,020	920	1,480	1,480	2,020	2,485	6,135	7,725
30.....	4,940		2,740	1,910	2,370	1,190	1,480	1,580	2,130	8,545	4,790	8,545
31.....	11,460		2,130		2,370	.....	1,480	1,580	.....	9,420	.....	6,135
Maximum.....	11,460	12,030	6,760	4,610	2,370	2,370	15,860	1,910	8,440	36,150	69,530	25,350
Minimum.....	4,770	590	450	920	1,010	220	1,480	1,480	1,480	1,480	1,450	2,255
Mean.....	7,056	4,281	2,809	2,209	1,750	1,288	2,758	1,491	2,086	4,955	15,167	8,177

\* Unreliable.

*Daily and monthly discharges, in liters per second, Matogdon River near Matogdon, Labo, Camarines Norte, for the year 1922*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1...	4,140	2,035	4,140	1,825	2,485	1,275	1,275	4,140	...	...	...	...
2...	4,140	11,330	2,435	1,825	2,035	1,630	1,630	2,035	...	...	...	...
3...	4,790	2,780	1,925	1,825	2,035	1,480	1,825	1,630	...	...	...	...
4...	5,470	2,485	660	2,035	2,035	3,580	1,825	1,275	...	...	...	...
5...	5,470	10,340	660	2,035	1,630	2,485	1,275	1,275	...	...	...	...
6...	5,470	3,580	660	2,035	1,630	1,825	1,275	1,275	...	...	...	...
7...	5,470	2,730	950	1,825	1,630	1,450	1,275	1,275	...	...	...	...
8...	4,140	2,035	950	1,825	1,480	1,275	1,275	1,275	...	...	...	...
9...	3,580	2,035	2,035	1,825	1,630	1,275	1,275	1,275	...	...	...	...
10...	4,140	2,485	4,140	2,035	1,630	1,275	2,255	2,255	...	...	...	...
11...	4,140	2,035	3,245	2,485	1,275	1,275	1,275	2,485	...	...	...	...
12...	13,470	1,630	2,485	2,255	1,275	950	1,825	1,825	...	...	...	...
13...	8,545	1,825	3,830	2,485	1,630	1,105	1,275	1,275	...	...	...	...
14...	6,940	2,035	10,340	2,485	1,275	950	1,275	1,275	...	...	...	...
15...	6,185	1,825	6,940	2,485	1,630	1,105	1,275	1,275	...	...	...	...
16...	2,935	1,630	11,330	2,485	1,450	1,450	1,275	1,275	...	...	...	...
17...	2,485	1,630	4,140	2,485	1,275	1,275	1,275	1,275	...	...	...	...
18...	2,485	1,630	2,730	2,485	1,275	1,275	1,275	1,275	...	...	...	...
19...	2,035	5,470	2,485	3,245	950	1,275	1,630	1,630	...	...	...	...
20...	2,985	3,530	2,485	2,485	1,105	1,105	1,105	1,630	...	...	...	...
21...	2,435	2,035	3,530	2,485	1,630	5,825	1,630	1,630	...	...	...	...
22...	2,985	2,485	2,985	2,485	3,580	2,985	2,985	2,985	...	...	...	...
23...	2,985	2,035	2,035	2,035	2,485	1,630	2,485	2,485	...	...	...	...
24...	2,035	1,630	2,035	2,255	2,035	1,275	2,730	2,730	...	...	...	...
25...	2,485	1,630	2,035	2,485	1,630	1,275	2,985	2,985	...	...	...	...
26...	2,485	2,035	5,560	2,035	1,630	1,950	2,035	2,035	...	...	...	...
27...	8,130	1,275	2,485	2,035	1,275	950	2,035	2,035	...	...	...	...
28...	4,140	1,275	2,035	2,035	1,825	950	1,630	1,630	...	...	...	...
29...	4,790	...	2,035	2,035	1,825	950	1,630	1,630	...	...	...	...
30...	3,245	...	2,035	2,035	1,630	1,630	1,450	1,450	...	...	...	...
31...	2,035	...	2,035	...	1,275	...	1,275	1,275	...	...	...	...
Maximum	13,470	11,330	11,330	3,245	3,530	6,940	2,985	4,140	...	...	...	...
Minimum	2,035	1,275	660	1,825	950	950	1,275	2,035	...	...	...	...
Mean...	4,413	2,846	3,181	2,228	1,663	1,772	1,707	2,181	...	...	...	...

## CAMARINES NORTE PROVINCE

## SAN VICENTE RIVER, SAN VICENTE

LOCATION.—About 600 m. northeast of San Vicente.

RECORDS AVAILABLE.—From January 1, 1921, to December 31, 1922.

GAGE.—Standard metric gage board vertically fastened to a tree on the left bank of the river.

DISCHARGE MEASUREMENTS.—Made by wading about 25 m. below the gage.

CHANNEL AND BANKS.—One channel at all stages; straight for 100 m. above and 90 m. below. Bed of stream sandy and gravelly. Both banks low and covered with vegetation; subject to overflow.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 39,880 second-liters on November 25, 1921; minimum discharge, 123 second-liters on June 28–29, 1921.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Gage read twice daily. Daily discharge determined from fairly well-defined curves. For low water stages, record may probably be in error due to formation of rapids below station.

*Discharge measurements of San Vicente River, near Calabagas, San Vicente, Camarines Norte*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1921</b>				
March 9	O. B. and Buchanan	.62	2,687	
April 14.	do	.48	444	
April 25.	Buchanan and S. Musa	.50	689	
June 6..	S. Musa..	.44	228	
July 27	do	.48	427	
August 17.	do.	.47	365	
September 10	do	.52	804	
October 25	O. B. and Musa	.74	3,775	
November 27..	O. Buenaventura	.76	4,243	
December 2	do	.72	3,613	
December 21	S. Musa	.73	4,779	
December 22	do	.66	3,200	
<b>1922</b>				
January 13	do	.72	3,784	
January 14.	do.	.62	2,416	
January 16	do.	.55	1,519	
January 17..	do.	.53	1,348	
February 21..	do.	.54	1,496	
February 24. .	do.	.50	920	
March 17	O. B. and S. Musa..	.63	1,942	
March 18	do.	.54	899	
April 20	do	.47	494	
April 22.	do.	.46	440	
May 9.	do	.42	322	
May 11	do.	.42	402	
May 12..	do.	.42	398	
May 13..	do.	.42	392	
June 30..	O. Buenaventura	.46	515	
July 3	do.	.50	674	
July 26.	do.	.46	657	
August 15..	do.	.42	287	
August 18	do.	.41	238	
September 5.	do.	.42	840	
September 8.	do.	.38	282	
October 17.	do.	.60	895	
November 7.	do.	.65	1,291	
December 25	do.	1.39	8,951	

*Daily and monthly discharges, in liters per second, of San Vicente River near Calabagas, San Vicente, Camarines Norte,  
for the year 1921*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	3,727	20,080	2,910	878	597	512	227	432	686	686	4,170	2,540
2	2,540	4,405	2,200	686	512	512	512	432	512	686	6,280	1,886
3	2,200	3,727	3,403	686	512	512	2,910	360	512	1,092	10,840	2,200
4	2,200	10,840	1,886	686	512	512	26,680	432	512	1,336	13,480	11,170
5	2,042	3,727	1,596	686	432	512	2,540	512	512	1,596	10,180	6,880
6	1,596	2,910	3,302	982	432	512	1,092	360	597	878	6,280	4,905
7	1,466	14,140	17,440	686	432	432	878	360	512	597	5,170	4,905
8	1,596	22,720	4,170	686	512	686	878	432	597	597	6,280	4,645
9	1,466	4,905	2,910	512	512	512	686	432	878	686	25,360	5,170
10	1,336	2,910	2,540	512	512	512	597	432	597	597	25,360	4,905
11	1,212	2,200	2,042	512	512	512	512	360	10,180	3,727	7,540	4,405
12	1,092	1,886	1,736	512	512	512	597	432	4,170	4,170	5,170	3,944
13	982	2,540	1,596	512	432	360	360	432	2,200	1,736	4,640	4,170
14	878	1,886	1,336	432	432	512	360	360	982	2,366	3,727	8,860
15	1,336	1,466	2,910	512	512	512	360	432	878	3,666	2,540	6,880
16	4,646	1,336	4,646	512	512	512	360	360	597	597	2,200	6,280
17	2,722	1,092	8,860	512	512	432	360	432	432	597	2,200	5,170
18	1,596	1,886	14,140	512	360	360	360	512	360	878	3,727	5,170
19	1,336	2,200	5,170	512	360	360	512	432	360	432	5,170	5,170
20	1,092	12,490	3,944	512	360	512	432	432	360	512	5,170	5,170
21	878	12,160	3,302	512	432	512	360	432	878	512	5,990	6,880
22	686	8,200	2,200	686	360	512	292	512	597	1,336	28,660	4,170
23	781	4,170	1,886	512	360	512	432	512	597	14,470	35,260	2,540
24	2,910	1,596	1,596	512	360	360	432	360	512	26,020	11,500	3,302
25	686	34,600	1,836	686	512	597	432	360	597	4,170	39,880	12,140
26	686	22,060	1,336	686	512	512	512	432	878	11,170	17,770	14,140
27	5,710	1,092	1,092	597	512	27	512	432	781	4,646	6,710	6,880
28	686	3,944	1,092	597	512	123	432	597	686	3,737	4,905	5,170
29	4,905	.....	982	686	512	123	432	512	878	1,886	3,302	3,302
30	5,435	.....	878	686	512	171	360	432	2,540	2,910	3,510	2,910
31	19,090	.....	878	.....	512	.....	432	512	.....	8,860	.....	1,596
Maximum	19,090	34,600	17,440	982	686	982	26,680	597	10,180	26,020	39,880	14,140
Minimum	686	1,092	878	432	360	123	227	360	360	432	2,200	1,596
Mean	2,350	7,611	3,388	604	475	470	1,486	444	1,263	3,370	10,446	5,376

*Daily and monthly discharges, in liters per second, of San Vicente River near Culabagas, San Vicente, Camarines Norte,  
for the year 1922*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	1,394	1,272	2,416	675	385	338	385	385	304	690	1,310	2,470
2.....	1,152	5,306	1,272	605	385	338	338	338	338	610	1,210	2,340
3.....	1,394	1,892	1,920	545	385	338	675	385	338	540	1,410	2,220
4.....	1,394	1,394	698	452	360	304	545	338	304	540	2,100	2,470
5.....	1,640	4,506	698	450	338	545	450	320	338	475	1,860	3,985
6.....	1,394	3,869	600	415	360	338	385	1,589	320	475	1,740	12,000
7.....	1,152	2,416	508	492	385	338	338	545	304	540	1,620	3,370
8.....	805	1,152	508	450	360	304	338	450	280	575	1,620	3,200
9.....	1,220	920	698	490	338	338	320	385	385	1,860	1,620	4,650
10.....	1,152	568	698	450	338	338	385	338	338	1,310	1,565	3,060
11.....	6,100	698	698	450	338	338	338	338	320	1,460	1,510	3,200
12.....	4,186	698	698	751	338	338	338	338	304	1,365	1,310	2,300
13.....	2,690	600	1,394	998	338	320	320	338	304	1,030	1,310	1,980
14.....	1,892	508	1,640	545	338	304	415	320	304	1,120	1,120	1,510
15.....	1,640	425	2,074	450	338	415	338	338	304	1,150	1,930	1,920
16.....	1,394	698	1,698	450	338	338	385	338	338	1,410	850	3,890
17.....	1,394	698	1,998	450	338	338	385	338	338	1,510	850	6,240
18.....	920	600	912	450	338	338	385	338	338	1,360	770	8,405
19.....	1,152	920	830	545	545	338	385	320	304	1,310	690	16,510
20.....	1,764	2,690	1,376	605	830	385	385	338	338	1,310	895	3,285
21.....	2,640	1,152	1,376	605	830	385	385	338	2,975	1,210	1,920	2,220
22.....	2,828	920	1,589	450	675	338	415	320	2,975	1,210	1,920	2,220
23.....	1,394	320	830	450	492	338	1,942	304	1,030	1,030	1,740	16,705
24.....	1,394	320	830	415	415	338	338	304	940	1,030	1,620	16,705
25.....	2,690	920	1,812	450	415	338	338	304	985	1,360	1,620	3,385
26.....	2,690	698	1,589	450	338	338	338	304	985	1,360	1,620	3,385
27.....	2,690	698	1,589	450	338	338	338	304	985	1,360	1,620	3,385
28.....	2,690	698	1,589	385	338	304	338	304	850	1,410	9,080	2,470
29.....	2,383	.....	830	338	338	545	338	304	770	1,310	2,750	3,125
30.....	1,892	.....	751	338	338	.....	415	304	.....	1,210	.....	2,680
31.....	920	.....	.....	.....	304	.....	415	304	.....	.....	.....	.....
Maximum	6,100	5,306	2,416	998	830	545	1,942	1,589	2,975	2,610	9,080	16,705
Minimum	805	425	508	385	304	304	304	304	280	475	690	1,510
Mean.....	1,804	1,409	1,073	502	397	367	486	383	640	1,185	1,796	5,059

## CAMARINES SUR PROVINCE

### ANAYAN RIVER, PILI

**LOCATION.**—About 250 m. northeast of Km. Post No. 16 of the Naga-Iriga Road and about 150 m. east of the municipal agricultural inspector's residence.

**RECORDS AVAILABLE.**—From March 6, 1919, to December 31, 1922. Also from January 1, 1911, to April 20, 1912, inclusive, at the old location very near the present station.

**GAGE.**—Standard metric gage board vertically spiked to a tree at the left bank of the river.

**DISCHARGE MEASUREMENTS.**—Made by wading at low and ordinary high water at section of gage.

**CHANNEL AND BANKS.**—Channel is straight above and below for 25 m.; banks are high and not subject to overflow. At measuring section stream bed is sandy and very shifting; flow uniform, and good results can be obtained at low water stage.

**EXTREMES OF DISCHARGE.**—Maximum discharge recorded during period of observation, 22,000 second-liters on July 1, 1911; minimum discharge, 106 second-liters on June 17, 1919.

**DIVERSIONS.**—None.

**REGULATION.**—None.

**UTILIZATION.**—For irrigation purposes.

**ACCURACY.**—Daily discharges from January 1, 1911, to April 19, 1912, determined from poorly-defined rating curve; from March 6 to December 31, 1922, from fairly well-defined curves. Gage read twice daily.

*Discharge measurements of Anayan River, near Anayan, Pili,  
Camarines Sur*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1910</b>				
December 24 . . . . .	J. I. Quinn. . . . .	2 16	5,660	. . . . .
<b>1911</b>				
January 4 . . . . .	do. . . . .	1 53	990	. . . . .
January 14 . . . . .	do. . . . .	1 49	1,011	. . . . .
January 25 . . . . .	do. . . . .	1 45	710	. . . . .
February 6 . . . . .	do. . . . .	1 45	730	. . . . .
February 9 . . . . .	do. . . . .	1 45	922	. . . . .
February 14 . . . . .	do. . . . .	1 48	806	. . . . .
February 17 . . . . .	do. . . . .	1 62	1,335	. . . . .
February 21 . . . . .	do. . . . .	1 97	3,194	. . . . .
March 2 . . . . .	do. . . . .	1 51	823	. . . . .
March 7 . . . . .	do. . . . .	1 48	605	. . . . .
March 18 . . . . .	do. . . . .	1 50	793	. . . . .
March 22 . . . . .	do. . . . .	1 47	735	. . . . .
March 24 . . . . .	do. . . . .	1 46	620	. . . . .
March 27 . . . . .	do. . . . .	1 49	806	. . . . .
April 4 . . . . .	do. . . . .	1 61	580	. . . . .
April 8 . . . . .	do. . . . .	1 56	470	. . . . .
April 20 . . . . .	do. . . . .	1 57	610	. . . . .

**NOTE.**—Gage heights from February 28, 1919 referred to a different datum.

*Discharge measurements of Anayan River, near Anayan, Pili, Camarines Sur—Continued*

Date	Made by—	Gage height (meters)	Discharge (second- liters)	Remarks
<b>1911</b>				
April 27.....	J. I. Quinn.	1.55	660	
May 10.....	do.	1.55	690	
May 24.....	do.	1.53	680	
June 7.....	do.	1.52	650	
June 17..	do.	1.52	560	
July 7.....	do.	1.50	870	
July 21.....	do.	1.55	950	
August 4..	do.	1.51	680	
August 16..	do.	1.47	640	
August 30.....	do.	1.43	850	
September 15.....	do.	1.44	780	
September 18.....	do.	1.48	630	
<b>1919</b>				
February 28..	W. Demers and Fegarido	21	280	
April 11.....	do.	19	200	
April 29.....	A. Fegarido	17	170	
May 5.....	do.	17	160	
May 30.....	do.	17	170	
June 11.....	do.	19	200	
June 17.....	do.	12	80	
August 7.....	do.	60	930	
August 12.....	do.	52	727	
September 8.....	do.	20	230	
September 12.....	do.	29	410	
October 15.....	do.	28	460	
October 18.....	do.	19	210	
November 11.....	do.	24	350	
<b>1920</b>				
January 20.....	M. B. Canas	20	270	
February 10.....	do.	18	110	
February 13.....	do.	18	110	
March 11.....	do.	18	100	
March 13.....	do.	18	70	
April 14.....	do.	17	160	
April 19.....	do.	15	110	
May 10.....	do.	19	160	
May 14.....	do.	19	230	
June 10.....	do.	31	420	
June 15.....	do.	31	560	
July 3.....	do.	44	590	
July 24.....	M. B. Canas and O. Buenaventura	31	530	
July 27.....	do.	30	500	
August 5.....	O. Buenaventura	20	248	
August 18.....	do.	24	288	
August 20.....	do.	48	854	
September 6.....	do.	25	323	
September 10.....	do.	20	241	
September 18.....	do.	18	221	
September 23.....	do.	43	716	
October 8.....	do.	18	220	
October 14.....	do.	56	1,148	
October 23.....	do.	22	263	
October 27.....	do.	19	330	
November 6.....	do.	20	251	
November 10.....	do.	20	347	
November 22.....	do.	18	296	
December 4.....	do.	22	360	
December 10.....	do.	23	376	
December 23.....	do.	16	226	
<b>1921</b>				
January 8.....	do.	17	237	
January 12.....	do.	16	242	
January 25.....	do.	14	212	
January 29.....	do.	19	290	
February 9.....	do.	30	519	
February 14.....	do.	20	331	
February 22.....	do.	32	585	
February 26.....	do.	26	437	
March 12.....	do.	20	317	
March 16.....	do.	20	354	
March 29.....	do.	14	221	
March 25.....	do.	17	298	

*Discharge measurements of Anayan River, near Anayan, Pili, Camarines Sur—Continued*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1921</b>				
April 7...	O. Buenaventura	.15	229	
April 23...	do.	.13	203	
April 28...	do.	.12	194	
May 5...	do.	.10	181	
May 7...	do.	.09	166	
June 16...	do.	.14	223	
June 27...	do.	.14	173	
July 14...	do.	.16	243	
July 23...	do.	.44	853	
August 9...	do.	.20	340	
September 7...	do.	.29	593	
September 15...	do.	.29	936	
September 23...	do.	.20	384	
October 7...	do.	.18	300	
October 10...	do.	.16	324	
November 8...	do.	.22	385	
November 26...	S. Musa	.86	3,015	
December 7...	do.	.29	526	
December 20...	O. Buenaventura	.28	645	
December 27...	do.	.33	1,062	
December 28...	do.	.28	905	
<b>1922</b>				
January 5...	do.	.20	513	
January 9...	do.	.21	538	
January 18...	do.	.20	516	
January 23...	do.	.20	510	
February 4...	S. Musa	.23	662	
February 14...	O. Buenaventura	.26	677	
February 25...	do.	.23	594	
February 27...	do.	.25	559	
March 8...	S. Musa	.24	482	
March 25...	O. Buenaventura	.15	388	
April 6...	do.	.16	377	
April 15...	do.	.18	269	
April 25...	do.	.18	463	
May 5...	do.	.16	403	
May 10...	do.	.15	257	
May 17...	do.	.12	223	
May 25...	do.	.13	231	
June 5...	do.	.13	226	
June 24...	do.	.16	373	
July 11...	do.	.20	572	
July 20...	do.	.42	1,409	
August 7...	do.	.43	1,469	
August 22...	do.	.15	374	
August 29...	do.	.12	288	
September 2...	do.	.13	327	
September 21...	do.	.22	597	
October 3...	do.	.18	615	
October 12...	do.	.23	867	
October 19...	do.	.15	557	
October 26...	do.	.25	1,017	
October 31...	do.	.16	495	
November 3...	do.	.13	362	
November 16...	do.	.39	1,450	
December 2...	do.	.24	865	
December 7...	do.	.19	635	
December 14...	do.	.17	514	



Daily and monthly discharges, in liters per second, of Anayan River near Anayan, Pili, Camarines Sur, for the year 1911

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.	600	700	870	730	680	650	22,000	800	800	660	620	...
2.	890	740	790	660	780	650	4,700	700	800	660	680	...
3.	1,060	720	790	660	840	650	1,400	660	790	600	680	...
4.	890	700	740	555	840	650	1,140	720	780	600	520	...
5.	840	700	720	600	870	650	1,060	720	760	650	520	...
6.	780	740	660	560	860	650	1,000	720	870	650	520	...
7.	820	820	600	560	780	650	1,860	710	760	650	1,200	...
8.	840	840	600	550	740	650	860	800	720	640	820	...
9.	820	820	600	560	700	650	860	760	720	730	920	...
10.	830	880	620	600	700	650	940	780	700	730	1,540	...
11.	1,250	2,400	620	480	820	620	910	760	700	860	2,500	...
12.	1,060	1,230	620	560	660	600	14,000	760	1,340	820	...	...
13.	520	1,160	620	560	600	600	8,200	800	780	680	...	...
14.	1,000	1,820	620	560	630	860	6,400	660	840	620	...	...
15.	940	2,000	630	600	660	580	2,200	620	760	576	...	...
16.	900	1,720	640	560	660	580	1,300	620	560	600	...	...
17.	840	1,340	710	620	700	580	1,080	1,760	630	700	...	...
18.	840	2,500	720	600	700	900	1,080	1,400	620	700	...	...
19.	820	9,200	740	620	680	1,100	1,080	1,400	620	700	...	...
20.	840	5,000	740	560	700	1,000	1,160	1,000	840	620	...	...
21.	820	3,000	750	610	700	920	940	800	1,120	670	...	...
22.	760	1,700	760	600	700	860	1,000	1,450	1,500	700	...	...
23.	1,000	1,200	620	910	650	800	1,180	820	820	670	...	...
24.	710	1,050	600	700	650	800	860	1,250	760	620	...	...
25.	710	1,500	630	710	650	860	860	960	700	700	...	...
26.	800	2,140	760	640	650	860	800	1,220	640	700	...	...
27.	740	2,260	860	640	680	800	600	880	740	700	...	...
28.	650	1,170	920	630	650	800	4,200	850	670	700	...	...
29.	650	...	820	640	650	800	1,500	840	670	620	...	...
30.	650	...	740	700	650	900	1,100	800	670	670	...	...
31.	700	680	730	...	680	...	1,000	800	...	670	...	...
Maximum.	1,250	9,200	920	910	870	1,100	22,000	1,760	1,500	860	2,500	...
Minimum.	600	700	600	480	600	580	600	620	560	570	520	...
Mean.	834	1,755	706	620	683	745	2,778	884	793	663	944	...

NOTE.—Daily discharges determined from a poorly defined curve. Data rather defective and accuracy not warranted. Gage heights not reliable on days for which discharge is not given.

Daily and monthly discharges, in liters per second, of Anayan River near Anayan, Pili, Camarines Sur, for the year 1912

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	400	430	360	380								
2	400	430	340	420								
3	400	430	320	280								
4	400	430	300	280								
5	400	430	300	300								
6	420	430	300	330								
7	450	430	300	300								
8	430	430	290	300								
9	430	430	300	250								
10	510	470	310	250								
11	580	390	310	350								
12	440	430	480	356								
13	440	430	400	380								
14	440	430	450	280								
15	390	470	400	280								
16	390	470	380	280								
17	390	470	380	280								
18	390	470	380	280								
19	390	470	330	280								
20	440	620	350	280								
21	440	200	330									
22	440	720	300									
23	390	590	380									
24	390	540	330									
25	430	520	330									
26	430	500	300									
27	430	470	300									
28	430	470	330									
29	430	400	300									
30	430	330	330									
31	430	380	380									
Maximum	580	1 200	480	420								
Minimum	390	390	290	250								
Mean	426	489	342	293								

NOTE.—Daily discharges determined from a poorly defined curve.

Daily and monthly discharges, in liters per second, of Anayan River near Anayan, Pili, Camarines Sur, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.				244	170	184	2,904	212	250	250	316	299
2.				240	170	170	5,151	212	282	235	250	353
3.				244	170	700	530	308	250	220	220	299
4.				228	170	170	440	404	250	220	190	452
5.				198	170	155	476	276	220	250	190	1,060
6.			228	184	170	155	372	712	220	235	190	692
7.			212	184	170	155	340	932	250	250	190	411
8.			212	184	184	155	260	584	250	266	190	282
9.			228	184	184	260	228	792	515	282	220	391
10.			244	184	184	308	308	404	580	978	220	353
11.			244	198	212	198	260	476	882	476	316	353
12.			212	198	198	170	228	712	882	476	316	353
13.			212	198	212	156	212	476	882	476	316	353
14.			212	198	212	156	212	476	882	476	316	353
15.			212	198	212	156	212	476	882	476	316	353
16.			212	198	212	156	212	476	882	476	316	353
17.			212	198	212	156	212	476	882	476	316	353
18.			212	198	212	156	212	476	882	476	316	353
19.			212	198	212	156	212	476	882	476	316	353
20.			212	198	212	156	212	476	882	476	316	353
21.			212	198	212	156	212	476	882	476	316	353
22.			212	198	212	156	212	476	882	476	316	353
23.			212	198	212	156	212	476	882	476	316	353
24.			212	198	212	156	212	476	882	476	316	353
25.			212	198	212	156	212	476	882	476	316	353
26.			212	198	212	156	212	476	882	476	316	353
27.			212	198	212	156	212	476	882	476	316	353
28.			212	198	212	156	212	476	882	476	316	353
29.			212	198	212	156	212	476	882	476	316	353
30.			212	198	212	156	212	476	882	476	316	353
31.			212	198	212	156	212	476	882	476	316	353
Maximum			276	276	308	1,896	5,151	932	882	1,362	1,482	1,985
Minimum			212	170	170	106	184	220	220	220	190	250
Mean			238	198	195	256	635	379	316	393	393	443

NOTE.—Daily discharge determined from a fairly well-defined curve from 150 to 930 second-liters, applicable from March 6 to August 31, and from a well-defined curve from 240 to 1,360 second-liters, applicable from September 1 to December 31.

*Daily and monthly discharges, in liters per second, of Anayan River near Anayan, Pili, Camarines Sur, for the year 1920*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	316	235	205	136	220	136	1,458	558	334	220	348	856
2	372	235	190	176	220	176	1,794	558	334	235	310	679
3	266	220	205	136	220	162	3,138	558	316	473	387	545
4	316	220	190	136	220	176	3,138	558	334	473	1,448	329
5	353	220	190	136	220	205	1,050	250	334	235	1,497	735
6	316	220	220	136	220	558	1,431	250	334	220	348	825
7	299	205	190	136	235	558	473	266	334	205	310	429
8	299	220	220	149	235	353	738	266	353	205	275	407
9	266	220	220	176	235	536	473	266	391	220	292	329
10	282	220	220	190	235	452	558	266	250	220	292	367
11	250	220	220	190	235	252	1,098	353	250	220	292	329
12	266	220	220	205	220	266	1,482	299	250	190	275	310
13	473	220	220	299	220	431	1,554	282	220	190	292	310
14	431	250	176	205	235	391	1,362	353	220	190	292	310
15	266	266	176	176	250	452	1,218	558	220	1,650	348	810
16	250	235	176	176	252	454	1,170	558	220	3,930	387	310
17	250	220	190	149	282	473	1,882	282	220	2,922	329	473
18	250	220	190	176	282	374	854	316	220	494	310	429
19	250	220	176	176	205	299	738	353	220	411	387	387
20	250	205	190	250	646	282	692	316	220	2,946	292	329
21	250	190	190	205	494	299	692	334	190	2,946	275	292
22	250	190	190	353	353	316	738	334	190	2,178	275	292
23	250	190	176	190	250	669	786	316	452	407	275	292
24	250	190	162	162	250	602	858	316	624	310	275	275
25	220	190	162	162	250	536	558	282	646	292	275	275
26	220	190	162	162	220	473	646	316	1,674	275	275	258
27	220	190	162	205	220	602	1,002	353	858	275	275	258
28	205	205	149	220	205	646	810	1,482	558	275	275	275
29	205	190	149	220	162	1,122	692	1,482	334	275	275	275
30	205	.....	136	220	190	1,956	580	1,122	220	275	275	258
31	205	.....	136	.....	176	.....	580	1,122	.....	292	.....	242
Maximum	473	266	220	299	810	1,956	3,138	1,482	1,674	3,930	1,448	856
Minimum	205	213	186	136	162	136	431	250	190	190	275	242
Mean	274	213	186	183	273	479	1,039	472	378	905	346	385

NOTE.—Daily discharge determined from a well-defined curve from 220 to 1,360 second-liters, applicable from January 1 to December 31.

Daily and monthly discharges, in liters per second, of Anayan River near Anayan, Pili, Camarines Sur, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.	242	..	..	180	180	210	180	210	762	343	449	696
2.	242	..	..	180	180	210	210	210	449	249	970	696
3.	242	..	..	180	152	210	242	210	318	395	1,691	696
4.	242	..	..	180	180	210	1,362	242	507	507	1,691	630
5.	242	..	..	180	152	210	735	210	507	567	2,630	2,630
6.	242	..	..	180	152	210	473	226	507	294	449	829
7.	242	..	..	180	180	210	310	521	385	294	843	829
8.	242	..	..	180	210	210	310	385	294	294	843	829
9.	242	..	..	210	210	180	271	294	294	294	843	829
10.	242	..	..	180	152	210	242	970	318	271	696	507
11.	210	..	..	180	152	210	242	395	2,830	271	21,550	507
12.	296	..	..	180	180	210	242	395	2,880	294	2,880	449
13.	210	..	..	180	180	210	242	318	9,280	294	1,433	395
14.	258	..	275	180	180	242	242	294	1,194	294	1,433	395
15.	292	..	275	180	180	242	242	249	898	449	630	2,432
16.	275	..	310	180	210	310	226	318	567	507	249	1,226
17.	310	..	292	180	180	180	210	249	478	449	121	878
18.	292	..	310	275	210	180	242	227	395	395	121	878
19.	292	..	310	242	210	180	242	227	395	395	121	878
20.	292	..	310	242	210	180	242	227	395	395	121	878
21.	292	..	310	242	210	180	242	227	395	395	121	878
22.	292	..	310	242	210	180	242	227	395	395	121	878
23.	292	..	310	242	210	180	242	227	395	395	121	878
24.	292	..	310	242	210	180	242	227	395	395	121	878
25.	292	..	310	242	210	180	242	227	395	395	121	878
26.	292	..	310	242	210	180	242	227	395	395	121	878
27.	292	..	310	242	210	180	242	227	395	395	121	878
28.	292	..	310	242	210	180	242	227	395	395	121	878
29.	292	..	310	242	210	180	242	227	395	395	121	878
30.	292	..	310	242	210	180	242	227	395	395	121	878
31.	292	..	310	242	210	180	242	227	395	395	121	878
Maximum	310	310	310	275	310	310	1,362	1,116	10,690	507	21,550	2,630
Minimum	180	180	180	152	152	180	180	343	271	249	121	395
Mean	251	269	269	196	190	216	343	343	1,013	313	1,677	921

NOTE.—Discharge determined from fairly well-defined rating curves, applicable as follows: October 21, 1920, to August 7, 1921, fair below 1,540 second-liters; August 8 to December 14, 1921, fair below 3,000 second-liters. No record on days for which discharge is not given.

Daily and monthly discharges, in liters per second, of Anayan River near Anayan, Pili, Camarines Sur, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	723	538	723	374	503	259	438	1,322	259	943	370	1,357
2	878	573	723	374	799	287	374	919	287	740	370	943
3	647	647	723	345	503	316	878	619	438	622	740	805
4	573	573	761	374	470	316	573	503	374	568	2,460	871
5	503	573	723	374	438	345	503	609	503	2,206	1,649	943
6	503	799	723	374	374	316	503	723	573	1,547	943	680
7	573	647	723	406	374	316	438	1,046	878	805	568	568
8	598	573	647	374	374	316	470	685	378	1,649	568	464
9	573	573	573	438	345	316	226	503	1,003	1,649	464	464
10	573	573	573	438	438	316	438	438	573	943	370	370
11	573	573	573	438	374	374	438	961	961	680	370	464
12	799	573	609	406	374	345	406	573	1,134	740	805	464
13	838	609	609	438	287	345	647	470	1,134	568	843	464
14	573	723	573	470	316	374	438	503	838	568	2,037	464
15	647	723	609	438	316	374	438	438	573	568	2,596	684
16	647	723	647	470	316	316	438	503	573	805	1,805	805
17	647	647	647	503	287	316	723	1,322	438	568	1,181	805
18	503	609	647	573	287	374	1,989	1,805	438	568	1,100	568
19	609	647	647	573	287	316	1,989	1,647	761	464	568	2,885
20	573	723	503	503	316	316	1,578	573	503	464	568	1,860
21	573	723	573	503	316	374	2,212	438	438	370	1,190	805
22	573	723	374	503	316	374	2,212	374	5,054	370	1,547	1,547
23	503	723	374	503	316	438	1,748	316	2,792	286	568	805
24	573	685	374	503	316	406	1,524	316	1,420	370	568	1,860
25	647	723	374	503	316	374	1,919	259	919	327	464	1,450
26	503	723	438	503	287	316	573	259	16,248	680	416	1,268
27	573	723	573	503	287	316	378	233	12,157	880	15,349	2,885
28	374	647	374	470	316	345	1,922	316	5,925	680	7,445	1,181
29	573	573	374	438	316	374	723	259	2,206	568	12,765	805
30	573	573	374	503	287	503	503	259	1,268	464	2,830	5,469
31	573	573	438	503	287	503	1,980	259	.....	370	.....	14,437
Maximum	378	799	761	573	799	503	2,212	1,806	16,248	2,206	15,349	14,437
Minimum	503	538	374	438	259	346	860	536	259	708	370	370
Mean	607	657	588	452	355	346	860	536	1,624	708	2,210	1,860

Note.—Discharge determined from fairly well-defined rating curves, applicable as follows: December 15, 1921, to September 26 (a. m.) 1922, fair below 1,200 second-liters; September 26 (p. m.) to December 31, 1922, fair below 1,300 second-liters.

## CAMARINES SUR PROVINCE

## BARIT RIVER, IRIGA

LOCATION.—Forty-three km. from Naga on the upstream side of bridge on the Buhi-Naga Road.

RECORDS AVAILABLE.—From February 27, 1919, to December 31, 1922. Also from May 8, 1910, to March 30, 1912, inclusive, at the old station at exactly the same place as the present station.

GAGE.—Standard metric gage board divided into two sections of 1 m. and 2 m. and set vertically on to the right bank of river and to the abutment of the bridge, respectively.

DISCHARGE MEASUREMENTS.—Made by wading at low water; from bridge at high water.

CHANNEL AND BANKS.—Channel is straight for about 40 m. above and below; left bank high, right low. At measuring section the river bed is full of large boulders which more or less affect the measurements of flow. Shifting only at very high stages.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 100,000 second-liters on December 29, 1910; minimum discharge, 750 second-liters on August 18, 1920.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharges from May 8, 1910, to March 30, 1912, and from February 27, 1919, to May 2, 1920, determined from poorly defined curve; from January 11, 1921, to December 31, 1922, from well-defined curves. Gage read twice daily.

*Discharge measurements of Barit River, near Santiago, Iriga,  
Camarines Sur*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1910</b>				
March 16.....	J. I. Quinn.....	1.72	8,630	.....
March 17.....	do.....	1.92	11,670	.....
April 6.....	do.....	1.92	20,910	.....
May 11.....	do.....	1.86	10,105	.....
June 19.....	do.....	1.86	7,040	.....
June 25.....	do.....	1.89	5,860	.....
July 19.....	do.....	1.97	7,200	.....
July 19.....	do.....	1.97	7,251	.....
August 15.....	do.....	1.76	6,712	.....
October 19.....	do.....	1.95	11,020	.....
October 24.....	do.....	1.89	9,790	.....
October 25.....	do.....	1.90	10,370	.....
October 25.....	do.....	1.90	9,760	.....
October 30.....	do.....	1.88	9,260	.....
October 30.....	do.....	1.88	9,150	.....
November 2.....	do.....	2.27	23,310	.....
November 5.....	do.....	2.31	25,330	.....
November 9.....	do.....	2.16	22,010	.....
November 15.....	do.....	2.20	19,370	.....
November 15.....	do.....	2.20	20,210	.....
November 16.....	do.....	2.20	21,619	.....
November 29.....	do.....	2.22	22,180	.....
December 22.....	do.....	2.34	26,550	.....
<b>1911</b>				
January 6.....	W. Demers.....	2.46	41,260	.....
January 16.....	do.....	2.20	25,940	.....
January 24.....	do.....	2.04	17,790	.....
February 4.....	do.....	1.94	11,500	.....
February 8.....	do.....	1.93	11,470	.....
February 15.....	do.....	2.07	15,270	.....

*Note*—Gage heights from February 26, 1919, referred to a different datum.

*Discharge measurements of Barit River, near Santiago, Iriga,  
Camarines Sur—Continued*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1911</b>				
February 18	W. Demers	2.17	18,040	
March 3	do.	2.29	26,318	
March 8	do.	2.16	19,829	
March 21	do.	2.05	16,067	
March 25	do.	2.00	11,979	
March 28	do.	2.07	14,415	
April 8	do.	1.97	12,420	
April 12	do.	2.07	16,820	
April 18	do.	2.01	13,140	
April 26	do.	2.05	12,850	
May 8	do.	1.97	10,520	
May 23	do.	1.90	9,160	
June 6	do.	1.85	7,100	
June 8	do.	1.82	8,360	
June 30	do.	1.82	7,470	
July 8	do.	2.10	14,840	
July 20	do.	2.26	22,670	
August 3	do.	2.05	12,960	
August 15	do.	1.90	8,220	
August 31	do.	1.92	8,870	
September 14	do.	1.83	7,010	
September 16	do.	1.83	5,530	
September 19	do.	1.83	6,370	
September 26	do.	1.85	6,490	
October 13	do.	1.78	5,080	
October 17	do.	1.77	4,030	
December 11	do.	1.74	4,600	
December 13	do.	1.76	4,730	
December 22	do.	1.80	6,230	
<b>1912</b>				
January 8	do.	1.76	4,900	
January 12	do.	1.77	3,580	
January 21	do.	1.74	3,750	
February 9	do.	1.72	3,940	
February 15	do.	1.73	4,380	
February 24	do.	2.06	13,350	
March 1	do.	1.99	10,320	
March 9	do.	1.89	5,630	
March 15	do.	1.84	5,910	
<b>1919</b>				
February 26	W. Demers and A. Fegarido	.42	7,710	
April 14	do.	.44	3,550	
April 26	A. Fegarido	.43	3,346	
May 7	do.	.40	3,200	
May 27	do.	.45	3,760	
June 9	do.	.46	3,750	
June 19	do.	.46	4,040	
August 14	do.	.79	13,270	
September 6	do.	.63	7,780	
September 15	do.	.70	8,590	
October 10	do.	.64	7,130	
November 10	do.	.65	7,860	
November 15	do.	.78	12,200	
November 19	do.	.85	10,710	
December 2	do.	.90	11,150	
December 9	do.	1.08	16,800	
December 22	do.	.96	13,530	
<b>1920</b>				
January 19	M. B. Canas	1.02	16,700	
February 9	do.	.64	7,660	
February 14	do.	.64	7,680	
February 26	do.	.67	8,340	
March 9	do.	.60	6,620	
March 16	do.	.57	5,790	
April 12	do.	.48	4,320	
April 20	do.	.48	4,330	
May 7	do.	.42	4,430	
May 17	do.	.49	5,310	
June 9	do.	.48	6,520	
June 16	M. B. Canas and O. Buenaventura	.47	4,850	



*Discharge measurements of Barit River, near Santiago, Iriga,  
Camarines Sur—Continued*

Date	Made by—	Gage height (meters)	Discharge (second- liters)	Remarks
<b>1920</b>				
July 7.....	do	.52	6,720	
July 22.....	do	.41	6,460	
July 28.....	do	.50	7,560	
August 4.....	O. Buenaventura	.40	3,315	
August 11.....	do	.35	2,220	
August 17.....	do	.37	2,434	
August 27.....	do	.36	2,348	
September 4.....	do	.47	4,604	
September 10.....	do	.44	3,999	
September 18.....	do	.40	3,164	
September 24.....	do	.51	5,658	
October 7.....	do	.54	6,450	
October 15.....	do	.66	9,144	
October 22.....	do	.77	13,552	
October 28.....	do	.69	11,687	
November 5.....	do	.72	11,586	
November 11.....	do	.64	9,257	
November 20.....	do	.66	9,906	
November 26.....	do	.59	7,782	
December 4.....	do	.68	10,716	
December 11.....	do	.77	13,655	
December 22.....	do	.72	12,177	
December 27.....	do	.64	9,031	
<b>1921</b>				
January 7.....	do	.64	9,022	
January 14.....	do	.57	7,307	
January 24.....	do	.61	8,081	
January 29.....	do	.62	8,562	
February 8.....	do	.80	17,312	
February 14.....	do	.71	11,502	
February 22.....	do	.69	11,246	
February 26.....	do	.70	11,429	
March 10.....	do	1.16	34,456	
March 17.....	do	1.04	27,476	
March 23.....	do	.98	23,543	
March 30.....	do	1.02	25,804	
April 6.....	do	.71	11,674	
April 22.....	do	.58	7,485	
April 29.....	do	.55	6,719	
May 4.....	do	.54	6,333	
May 8.....	do	.52	6,212	
June 13.....	do	.56	7,643	
June 28.....	do	.60	8,045	
July 16.....	do	.68	10,632	
July 25.....	do	.61	8,580	
August 6.....	do	.56	7,290	
August 20.....	do	.47	4,647	
September 6.....	do	.58	7,629	
September 12.....	do	.66	10,448	
September 22.....	do	.67	10,465	
October 6.....	do	.62	8,709	
October 11.....	do	.59	8,042	
November 7.....	do	.82	15,519	
November 28.....	S. Musa	1.48	60,308	
December 6.....	do	1.18	35,741	
December 21.....	O. Buenaventura	.83	16,600	
December 28.....	do	1.10	30,931	
<b>1922</b>				
January 4.....	O. Buenaventura	.82	17,445	
January 10.....	do	.77	15,185	
January 17.....	do	1.00	26,862	
January 25.....	do	.78	16,011	
February 3.....	S. Musa	.70	13,945	
February 18.....	O. Buenaventura	.62	9,377	
February 24.....	do	.60	8,652	
February 28.....	do	.57	8,226	
March 7.....	S. Musa	.56	7,247	
March 8.....	O. Buenaventura	.55	6,781	
March 29.....	do	.63	8,768	
April 5.....	do	.58	7,349	
April 21.....	do	.50	5,777	
April 27.....	do	.52	5,892	

*Discharge measurements of Barit River, near Santiago, Iriga,  
Camarines Sur—Continued*

Date	Made by—	Gage height (meters)	Discharge (second- liters)	Remarks
<b>1922</b>				
May 5.....	O. Buenaventura.....	.50	5,490	
May 13.....	do.....	.50	5,565	
May 17.....	do.....	.51	5,862	
May 20.....	do.....	.49	4,748	
May 24.....	do.....	.52	6,389	
May 28.....	do.....	.48	6,051	
June 7.....	do.....	.48	5,896	
June 23.....	do.....	.43	5,405	
July 31.....	do.....	.70	9,757	
July 10.....	do.....	.74	10,437	
July 21.....	do.....	.59	7,427	
July 29.....	do.....	.56	6,614	
August 5.....	do.....	.70	7,758	
September 14.....	do.....	.59	7,375	
September 21.....	do.....	.64	7,675	
October 4.....	do.....	.66	10,463	
October 11.....	do.....	.62	9,058	
October 25.....	do.....	.57	7,272	
November 14.....	do.....	.74	11,896	
November 28.....	do.....	1.10	30,904	
December 7.....	do.....	1.11	33,107	
December 13.....	do.....	.95	22,834	
December 21.....	do.....	.88	21,484	

Daily and monthly discharges, in liters per second, of Barit River near Santiago, Iriga, Camarines Sur, for the year 1910

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....						7,600	13,000	11,000	6,600	13,200	10,500	19,400
2.....						7,000	15,000	13,600	6,600	13,260	10,500	18,000
3.....						7,400	9,500	13,000		21,000	22,000	18,000
4.....						7,000	10,000	14,500	6,600	18,700	25,600	21,000
5.....						6,800	9,000	16,000	7,500	24,400	26,000	26,000
6.....						6,800	8,400	11,000	7,000	17,400	26,000	39,000
7.....						6,400	8,400	13,600	6,800	16,000	23,600	36,500
8.....					10,200	6,400	8,800	16,000	6,800	16,000	21,000	35,000
9.....					10,000	6,400	9,000	14,600	6,800	17,000	20,000	48,000
10.....					10,500	6,000	8,800	7,300	6,800	17,000	20,200	30,000
11.....					10,200	6,400	7,700	9,000	7,000	15,400	22,000	26,000
12.....					10,200	6,800	7,000	7,000	7,000	13,800	23,000	23,500
13.....					9,300	6,800	8,400	6,800	8,200	14,600	22,600	22,000
14.....					8,000	6,800	9,000	6,400	8,000	13,600		22,000
15.....					7,800	6,500	10,200	6,400	8,200	12,000	18,000	20,000
16.....					7,800	6,200	10,500	6,400	8,400	12,500	21,000	20,000
17.....					7,300	6,200	10,200	6,800	9,000	10,500	18,600	23,500
18.....					7,300	6,200	11,300	6,800	8,400	10,800	18,000	22,200
19.....					6,800	6,000	12,000	6,000	9,100	10,000	18,000	22,000
20.....					6,800	5,800	11,400	6,000	9,100	9,500	17,000	21,400
21.....					5,800	5,800	10,600	6,000	9,100	9,200	16,500	20,400
22.....					5,200	5,800	10,500	6,000	9,500	9,200	28,000	24,000
23.....					7,100	6,000	11,400	5,800	9,500	9,000	30,000	27,000
24.....					6,400	6,200	10,000	6,000	9,000	8,800	30,000	72,000
25.....					7,000	6,200	9,200	6,000	9,000	8,800	24,000	77,000
26.....					6,800	6,200	9,000	6,000	8,200	8,400	23,500	92,000
27.....					7,000	6,100	9,200	6,000	8,200	9,000	27,000	88,000
28.....					7,000	15,000	11,000	6,000	11,700	8,400	23,500	71,000
29.....					7,600	19,000	11,000	6,000	11,700	8,000	24,000	72,000
30.....					7,600	19,000	10,200	6,200	13,400	8,400	21,500	100,000
31.....					7,600	.....	11,200	6,600	13,200	8,000	20,000	81,000
Maximum.....					10,500	19,000	15,000	16,000	13,200	21,000	30,000	100,000
Minimum.....					5,000	5,800	7,000	5,400	6,500	8,000	10,500	18,000
Mean.....					7,708	7,130	10,023	8,529	8,453	12,325	21,739	40,400

Note.—Daily discharges determined from a poorly defined curve. No records of gage heights for dates in which discharges are not given.

Daily and monthly discharges, in liters per second, of Barit River near Santiago, Iriga, Camarines Sur, for the year 1911

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.	68,000	12,700	29,000	13,500	11,400	7,600	15,500	13,800	8,200	5,700	3,800	4,000
2.	62,000	11,400	27,000	12,200	10,600	7,600	24,000	13,800	8,000	5,400	3,800	4,500
3.	53,000	11,200	25,000	12,400	10,600	7,000	20,000	13,000	8,000	5,000	3,500	4,500
4.	44,400	11,200	22,400	12,200	10,600	7,000	22,000	13,000	8,000	5,000	3,500	4,000
5.	42,000	10,500	21,600	12,000	10,600	6,600	20,000	12,000	8,000	6,000	3,800	4,100
6.	39,000	10,500	20,600	12,200	10,500	6,600	18,500	11,600	7,500	5,000	3,800	4,500
7.	35,000	11,000	20,000	11,200	10,500	7,500	17,400	11,000	7,000	5,400	3,800	4,500
8.	34,000	10,500	18,400	11,200	10,500	8,300	15,500	10,000	7,000	5,000	3,800	4,000
9.	34,000	10,500	17,200	12,000	10,000	8,000	15,600	9,400	7,000	5,000	3,800	4,000
10.	36,000	10,500	17,400	13,000	10,000	8,000	15,600	9,400	7,000	4,800	3,500	4,000
11.	33,800	13,500	17,000	17,000	10,500	8,000	16,800	9,400	7,200	4,500	3,500	4,000
12.	31,400	14,000	18,000	16,400	10,500	8,000	14,500	9,000	7,400	4,800	3,500	4,100
13.	31,400	14,000	18,000	15,000	10,500	8,000	17,000	8,600	7,200	4,800	3,500	4,100
14.	26,000	14,600	16,800	14,000	10,500	8,000	29,000	9,400	6,600	5,700	3,500	4,100
15.	26,000	15,000	16,800	14,000	10,000	8,000	32,000	8,200	6,000	5,800	3,500	4,100
16.	25,500	16,200	16,600	13,000	9,400	7,500	32,000	8,000	4,600	5,000	4,000	5,000
17.	24,000	16,600	16,000	14,000	9,400	8,000	24,000	7,400	5,400	5,000	4,000	5,000
18.	23,000	18,500	16,000	14,000	9,400	8,000	30,000	8,000	6,000	5,000	4,000	5,000
19.	20,800	20,000	15,800	14,000	9,800	8,000	26,000	9,800	6,000	5,000	4,000	5,000
20.	19,000	31,500	15,400	13,200	9,600	7,500	21,000	10,400	6,000	4,800	4,000	5,000
21.	18,500	37,000	14,500	12,000	9,600	6,800	23,000	10,400	6,000	5,000	4,000	5,000
22.	19,000	35,000	13,000	12,000	9,400	6,800	22,500	11,200	7,000	4,800	4,000	6,000
23.	18,000	32,000	12,700	14,000	9,000	7,800	21,500	12,000	6,400	4,800	4,000	6,000
24.	17,000	32,000	12,000	14,000	8,800	7,400	20,000	11,600	7,000	4,800	4,000	6,000
25.	16,000	32,000	12,500	13,000	8,700	7,000	18,000	11,000	7,000	4,400	4,000	6,000
26.	15,600	32,000	13,000	12,600	8,700	7,000	17,400	10,000	6,000	3,500	4,000	5,600
27.	15,500	27,400	13,000	12,000	8,700	7,000	17,000	9,800	5,000	3,200	4,100	6,000
28.	14,000	.....	14,000	12,000	8,800	7,400	17,000	9,800	5,000	4,600	4,000	5,400
29.	14,000	.....	13,400	11,400	8,000	7,400	11,800	8,600	5,400	4,000	4,000	6,000
30.	13,000	.....	12,500	.....	7,500	.....	14,500	8,600	.....	3,500	.....	5,400
31.	68,000	37,000	29,000	17,000	11,400	8,300	32,000	13,800	8,200	6,000	4,100	6,000
Maximum.	13,000	10,500	12,000	11,200	7,500	6,600	11,400	7,400	4,600	3,200	3,500	4,000
Minimum.	28,739	19,171	17,161	13,123	9,590	7,340	19,729	10,303	6,663	4,855	3,840	4,848
Mean.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

NOTE.—Daily discharges determined from a poorly defined curve.

Daily and monthly discharges, in liters per second, of Barit River near Santiago, Iriga, Camarines Sur, for the year 1912

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.	4,900	3,900	10,000									
2.	4,900	3,900	9,600									
3.	4,900	4,200	9,200									
4.	4,600	4,000	9,200									
5.	4,900	3,800	8,600									
6.	5,000	2,800	8,300									
7.	5,000	3,000	7,000									
8.	4,900	4,000	7,000									
9.	4,200	3,800	7,000									
10.	4,200	3,800	6,300									
11.	3,800	3,800	6,300									
12.	3,600	4,200	6,000									
13.	4,000	4,400	6,000									
14.	3,800	4,400	5,700									
15.	4,000	4,300	5,400									
16.	4,200	4,300	4,700									
17.	3,800	4,000	4,600									
18.	3,800	3,600	4,600									
19.	4,000	3,600	4,800									
20.	4,000	4,600	4,700									
21.	4,000	10,800	5,400									
22.	3,800	13,400	4,600									
23.	3,800	13,500	4,400									
24.	4,000	12,500	4,400									
25.	3,800	12,000	3,800									
26.	4,000	12,000	3,800									
27.	4,000	11,400	3,800									
28.	4,000	11,400	3,000									
29.	4,000	10,800	3,000									
30.	3,800		3,000									
31.	3,800											
Maximum.	5,000	13,600	10,000									
Minimum.	3,600	3,600	3,000									
Mean . . .	4,184	6,514	5,870									

NOTE.—Daily discharges determined from a poorly defined curve.

Daily and monthly discharges, in liters per second, of Barti River near Santiago, Iriga, Camarines Sur, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1			3,532	3,324	3,116	3,116	8,108	8,524	8,940	7,692	7,276	17,260
2			3,532	3,532	2,700	3,354	10,188	8,316	8,524	7,692	7,276	17,062
3			3,740	3,948	2,700	3,116	10,604	8,108	8,108	7,276	7,276	16,844
4			3,532	3,532	2,700	3,116	10,188	9,356	8,108	6,860	7,276	17,260
5			3,532	3,740	2,700	2,700	9,772	9,980	7,692	7,692	7,692	18,716
6			3,740	3,532	2,700	2,700	8,940	9,564	7,484	6,860	7,900	18,716
7			3,948	3,532	2,700	2,700	8,524	9,772	7,692	6,860	7,692	18,300
8			3,740	3,740	2,700	2,700	8,108	10,604	7,692	7,276	7,900	17,468
9			3,948	3,948	2,700	3,948	7,900	10,604	6,860	7,692	7,900	16,844
10			3,948	3,948	2,452	4,780	7,276	11,020	7,484	7,692	7,900	16,012
11			3,948	3,532	2,700	4,780	7,276	11,020	7,692	7,484	8,108	15,596
12			3,948	3,532	2,700	4,572	7,276	11,020	8,108	7,276	8,108	15,180
13			3,948	3,532	2,700	4,780	6,860	10,604	8,940	7,276	7,692	14,764
14			3,740	3,740	3,740	4,364	6,860	10,812	9,356	7,692	8,732	14,764
15			3,532	3,532	2,284	4,364	6,444	10,604	9,356	8,108	10,604	14,348
16			4,151	3,324	2,700	3,948	6,236	10,604	10,604	7,900	13,832	13,224
17			3,532	3,532	2,284	3,948	6,028	10,396	10,604	7,900	16,222	11,020
18			3,948	3,532	2,452	3,948	7,900	10,188	11,020	8,108	21,212	13,436
19			3,948	3,532	3,116	4,364	5,404	9,356	10,812	8,108	21,532	15,180
20			3,948	3,532	3,116	4,364	5,196	8,940	10,604	8,108	20,388	15,348
21			3,948	3,532	3,948	4,156	5,196	8,332	10,604	7,900	20,388	14,764
22			3,948	3,948	3,948	3,948	6,860	8,524	9,980	7,692	19,392	14,348
23			3,740	3,532	3,948	3,948	6,860	8,524	8,356	7,692	18,992	14,140
24			3,632	3,532	3,948	4,364	7,276	8,524	8,356	7,692	18,992	14,140
25			3,632	3,324	3,948	4,364	7,276	8,524	8,356	7,692	18,992	14,140
26		3,532	3,532	3,532	3,948	4,364	7,276	8,524	8,356	7,692	18,992	14,140
27		3,740	3,532	3,532	3,740	8,940	7,900	8,108	8,524	7,692	17,980	12,682
28			3,532	3,324	3,740	8,940	7,900	8,108	8,524	7,692	17,980	11,020
29			3,532	3,116	3,740	8,524	8,356	8,732	8,108	6,860	17,052	10,812
30			3,324	3,116	2,900	8,108	8,356	8,940	8,108	7,692	17,052	10,812
31			3,324	.....	3,116	.....	8,940	8,940	.....	7,276	.....	11,436
Maximum		3,740	4,364	3,948	4,156	8,940	10,604	11,020	11,020	8,316	21,836	18,716
Minimum		3,532	3,324	3,116	2,284	2,700	5,196	8,108	6,860	6,860	7,276	10,812
Mean		3,656	3,763	3,587	3,082	4,575	7,587	9,504	8,884	7,511	13,287	14,710

NOTE.—Daily discharge determined from a poorly defined curve, applicable from February 27, 1919, to May 2, 1920.

Daily and monthly discharges, in liters per second, of Barit River near Santiago, Iriga, Camarines Sur, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	13,724	9,356	8,108	5,612	3,948	4,760	2,840	4,280	4,760	5,730	8,780	7,745
2.....	13,724	8,940	7,692	5,404	3,948	4,520	2,600	4,280	4,520	5,730	8,260	9,520
3.....	12,684	8,940	7,692	6,236	3,900	4,280	2,600	4,040	4,760	5,730	9,040	19,580
4.....	13,100	8,940	7,434	4,780	3,900	4,280	5,240	3,320	4,760	5,240	10,340	10,340
5.....	14,348	8,524	7,276	4,780	3,320	4,520	5,480	3,320	4,280	5,240	10,340	10,340
6.....	14,348	8,524	6,216	4,572	3,320	4,280	5,730	2,370	3,800	5,240	10,340	10,340
7.....	13,936	8,108	6,860	4,364	3,320	4,760	5,730	2,370	3,800	5,240	10,340	10,340
8.....	13,936	7,900	6,860	4,364	3,320	4,760	5,730	2,370	3,800	5,240	10,340	10,340
9.....	13,100	7,900	6,860	4,364	4,280	4,760	5,240	1,910	3,560	5,240	9,520	12,680
10.....	13,100	7,900	6,860	4,364	4,280	4,760	5,240	1,910	3,560	5,240	9,520	12,680
11.....	13,308	7,484	6,444	4,572	4,280	4,520	5,730	1,680	3,800	5,240	9,300	11,900
12.....	12,476	7,276	6,444	4,572	4,280	4,520	5,730	1,680	3,800	5,240	9,300	11,900
13.....	14,348	7,276	6,236	4,363	4,760	4,760	5,980	1,450	3,320	5,000	8,780	11,320
14.....	14,764	7,692	6,236	4,988	4,280	4,280	5,980	1,220	3,320	5,000	8,780	11,320
15.....	15,180	9,356	6,028	5,196	5,000	4,280	5,730	980	3,080	9,300	9,040	10,340
16.....	15,596	10,188	6,444	5,196	4,520	4,520	5,730	980	2,840	11,640	9,300	11,120
17.....	16,012	9,980	6,444	4,988	5,000	4,280	5,240	1,450	3,080	14,570	9,040	11,640
18.....	16,012	9,564	6,028	4,572	5,240	4,280	5,240	760	2,840	14,080	9,300	11,380
19.....	15,596	9,356	6,028	4,364	5,730	4,280	5,480	980	3,320	14,300	9,040	10,340
20.....	15,596	9,356	6,028	4,364	5,730	3,080	5,730	980	3,800	12,950	8,780	10,340
21.....	15,180	9,148	6,028	4,364	6,230	5,240	5,240	1,450	4,760	12,420	8,780	10,340
22.....	16,180	8,940	5,612	4,156	6,230	5,240	5,240	1,450	5,000	12,420	8,780	10,340
23.....	14,140	8,524	5,612	4,156	6,980	5,240	5,000	1,450	5,000	11,900	9,520	9,520
24.....	14,140	8,524	5,612	4,156	6,980	5,240	5,000	1,450	5,000	11,900	9,520	9,520
25.....	13,524	8,108	5,240	4,364	5,240	5,730	5,000	1,450	5,730	10,340	7,745	9,040
26.....	13,524	8,108	5,240	4,364	5,240	5,730	5,000	1,450	5,730	10,340	7,745	9,040
27.....	12,684	8,524	5,612	4,156	5,240	4,280	5,000	1,910	6,230	10,080	7,235	8,900
28.....	11,228	8,524	5,612	4,156	5,000	3,500	5,240	2,370	5,730	9,560	6,730	8,520
29.....	10,188	8,108	6,028	3,948	4,760	3,320	5,240	3,560	6,230	9,300	6,730	8,520
30.....	9,980	.....	5,612	3,948	5,240	3,320	4,760	5,000	5,730	9,040	6,730	8,000
31.....	9,980	.....	5,612	3,948	4,760	.....	4,760	5,000	6,230	14,570	10,860	12,680
Maximum.....	16,012	10,188	8,108	6,236	6,980	5,730	6,230	5,000	6,230	14,570	10,860	12,680
Minimum.....	9,980	7,276	5,612	3,948	3,080	3,080	2,600	750	2,840	5,000	6,730	7,745
Mean.....	13,690	8,604	6,402	4,613	4,806	4,520	5,136	2,205	4,380	8,762	8,767	10,188

NOTE.—Daily discharges determined from a fairly well-defined curve from 3,000 to 5,500 second-liters, applicable from May, 3 to December 31.

Daily and monthly discharges, in liters per second, of Barit River near Santiago, Iriga, Camarines Sur, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	7,745	14,150	34,210	18,630	6,650	4,410	8,330	6,980	5,330	10,440	12,270	43,860
2.....	8,260	16,550	27,530	17,370	6,330	4,730	8,330	6,330	6,330	10,430	14,540	41,220
3.....	8,260	16,550	26,020	15,730	6,330	5,690	8,330	6,330	6,330	19,730	24,960	39,240
4.....	7,745	16,550	25,530	15,730	6,010	5,690	22,690	6,980	7,650	9,030	21,530	36,760
5.....	8,260	16,140	23,580	11,900	5,690	5,050	22,020	6,980	7,650	8,330	21,530	36,760
6.....	8,260	15,730	24,060	11,900	5,370	5,050	24,550	6,980	7,650	8,330	21,530	36,760
7.....	8,520	15,730	30,180	11,900	5,690	4,730	21,710	6,980	7,650	7,990	23,110	32,450
8.....	8,260	15,730	34,210	11,160	5,370	4,410	19,080	6,330	7,650	7,990	23,110	32,450
9.....	8,000	14,930	32,990	10,800	5,050	4,730	17,370	6,980	6,980	7,650	24,550	29,630
10.....	7,745	14,930	32,990	10,800	5,050	5,690	17,370	6,980	6,980	7,650	24,550	29,630
11.....	7,650	13,770	30,730	10,440	5,050	6,010	14,930	6,980	7,650	8,330	52,440	27,530
12.....	7,650	13,770	26,520	10,440	5,050	6,010	14,930	6,980	7,650	8,330	52,440	27,530
13.....	7,310	13,010	26,020	10,080	5,050	6,980	12,640	5,370	10,440	8,330	53,760	23,580
14.....	7,650	12,270	25,040	9,730	4,730	10,440	11,900	5,370	12,270	8,330	51,120	22,170
15.....	7,650	11,900	24,550	9,030	5,050	11,530	11,160	5,050	12,640	9,380	48,480	24,550
16.....	7,650	12,640	25,530	9,030	5,370	11,900	11,160	5,690	12,640	11,530	42,540	23,580
17.....	5,050	11,900	26,020	8,680	5,050	11,160	12,640	6,650	11,900	12,640	36,040	22,640
18.....	9,030	11,900	25,040	8,330	4,730	10,440	12,640	5,690	11,160	12,270	32,990	21,710
19.....	9,030	11,530	25,530	7,990	4,410	9,730	9,730	4,730	11,160	11,900	30,730	20,370
20.....	9,030	12,640	24,550	7,650	4,730	10,440	9,030	4,410	11,160	11,530	28,570	19,060
21.....	9,380	13,770	24,550	7,650	5,690	10,440	8,330	3,770	10,800	11,160	25,530	16,960
22.....	9,380	12,640	23,580	7,650	5,690	9,730	8,330	3,770	10,440	11,160	26,520	17,370
23.....	9,030	27,530	23,580	7,650	5,370	9,730	8,330	3,150	10,800	11,160	34,210	15,730
24.....	9,030	28,040	23,580	7,650	5,050	9,030	8,330	4,090	11,160	11,800	37,920	16,550
25.....	9,030	33,600	22,640	7,310	5,050	9,030	8,330	4,410	10,800	11,530	68,940	28,570
26.....	8,680	37,260	21,710	6,980	4,730	9,030	9,030	4,410	10,800	11,160	66,960	29,630
27.....	8,330	20,370	20,810	7,650	5,050	8,330	8,330	3,770	11,900	10,800	59,040	29,630
28.....	8,330	14,930	20,810	7,310	4,410	8,330	8,330	4,090	11,900	10,440	54,420	28,570
29.....	9,030	.....	22,640	6,980	4,410	7,990	7,650	5,050	11,160	10,800	49,800	26,520
30.....	10,800	.....	22,640	6,980	5,050	7,650	7,310	5,690	10,800	10,440	49,800	26,520
31.....	12,270	.....	20,810	.....	4,730	.....	6,980	6,010	.....	11,900	.....	25,530
Maximum.....	12,270	37,260	34,210	18,630	6,650	11,900	27,020	7,650	12,640	12,640	68,940	43,860
Minimum.....	5,050	11,530	20,810	6,980	4,410	4,410	6,980	3,150	6,330	7,650	12,270	15,730
Mean.....	8,453	16,845	25,748	10,050	5,225	7,816	12,491	5,570	9,854	10,289	37,369	26,862

NOTE.—Discharge determined from well-defined rating curve below 41,000 second-liters, applicable from January 11, 1921, to January 7, 1922.



Daily and monthly discharges, in liters per second, of Barit River near Santiago, Iriga, Camarines Sur, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	24,550	12,040	7,350	8,230	5,550	5,100	4,320	12,870	5,550	13,720	8,280	48,400
2.....	22,640	12,040	7,650	7,650	5,550	5,320	3,960	15,530	6,020	13,720	7,960	46,800
3.....	21,260	12,040	7,350	7,650	5,780	5,100	4,320	14,500	6,020	13,290	8,280	42,800
4.....	20,810	12,040	7,060	7,060	5,550	4,900	4,700	13,720	5,780	11,230	9,300	39,600
5.....	20,810	11,230	7,060	7,350	5,100	5,100	4,320	13,720	5,780	10,440	15,930	37,500
6.....	19,060	12,870	7,060	6,790	5,100	5,100	4,700	14,500	6,520	10,440	17,480	37,500
7.....	18,630	12,040	6,520	5,320	5,100	5,100	4,700	13,720	6,520	10,440	17,480	36,400
8.....	19,020	12,040	6,520	5,320	5,100	4,700	4,700	13,720	6,520	10,440	16,800	34,000
9.....	16,970	11,230	6,020	5,550	4,900	4,700	4,700	12,040	7,060	9,670	15,000	31,720
10.....	16,480	10,440	6,520	6,520	6,020	4,700	4,700	12,040	7,060	8,950	15,530	29,560
11.....	18,480	10,440	6,520	6,270	5,780	4,700	5,320	11,630	7,650	8,950	15,060	28,150
12.....	28,150	10,440	6,520	6,020	5,550	4,320	5,100	10,440	8,280	8,610	14,600	25,420
13.....	28,150	10,050	6,270	6,020	5,550	4,140	5,100	10,440	8,280	8,280	13,720	24,130
14.....	29,560	9,670	6,520	6,270	5,100	4,320	5,100	11,230	8,950	7,960	13,720	22,330
15.....	30,280	8,950	6,790	6,520	5,100	4,320	5,100	11,230	8,280	8,280	12,870	20,620
16.....	28,150	8,950	7,060	6,270	5,550	4,500	4,700	11,230	8,280	7,650	12,040	18,480
17.....	26,760	8,950	7,060	6,020	5,550	4,320	5,100	11,230	8,280	7,650	12,040	17,960
18.....	24,760	8,950	7,060	5,780	5,550	4,500	5,100	10,830	8,950	7,350	11,630	18,480
19.....	22,930	8,610	7,060	5,550	5,550	4,320	5,100	10,440	10,050	7,650	11,230	26,080
20.....	20,620	8,950	6,520	5,550	5,550	4,320	5,320	9,670	9,300	7,350	12,450	26,080
21.....	19,540	8,610	6,270	5,780	6,020	4,140	5,550	8,950	11,230	7,060	13,290	47,600
22.....	18,480	8,280	6,020	6,270	5,550	4,140	7,350	8,280	13,720	7,060	13,720	57,200
23.....	17,460	8,280	6,020	6,020	6,020	4,320	8,280	7,960	15,530	7,060	12,870	54,800
24.....	16,000	7,960	6,270	6,020	5,550	4,320	9,670	7,060	14,600	7,350	12,040	50,000
25.....	15,060	7,650	6,020	6,020	5,550	4,140	8,950	7,060	15,060	7,350	12,040	50,000
26.....	13,720	7,650	8,950	6,020	5,320	3,960	8,610	7,060	15,060	7,350	33,230	52,400
27.....	13,290	7,650	9,670	5,780	5,100	3,960	8,610	6,790	14,600	7,350	33,230	50,000
28.....	13,290	.....	9,300	5,550	5,320	3,960	8,610	6,270	14,600	8,280	50,800	50,000
29.....	12,870	.....	8,950	5,550	5,100	4,320	11,630	9,670	.....	8,280	50,800	46,000
30.....	12,040	.....	8,280	.....	5,100	.....	.....	5,550	.....	.....	.....	47,600
31.....	30,280	12,870	9,670	8,280	6,020	5,320	11,630	15,530	15,530	13,720	50,800	57,200
Maximum	30,280	12,870	9,670	8,280	6,020	5,320	11,630	15,530	15,530	13,720	50,800	57,200
Minimum	12,040	7,650	6,020	5,550	4,900	3,960	3,960	5,550	5,550	7,060	7,960	17,960
Mean	20,350	10,000	7,066	6,273	5,452	4,499	6,072	10,479	9,530	8,873	15,983	36,878

Note.—Discharge determined from well-defined rating curve below 24,000 second-liters, applicable from January 8 to December 31, 1922.

## CAMARINES SUR PROVINCE

## BATO LAKE, BATO

LOCATION.—About 500 m. west from the end of the street leading to the church from the lake, of the town of Bato and at a place between the town of Bato and the outlet of the Bicol River.

RECORDS AVAILABLE.—From August 13, 1910, to April 20, 1912.

GAGE.—Standard metric gage board vertically nailed to the inside of a box filled with rock, set into the bed of lake near shore line.

DISCHARGE MEASUREMENTS.—None made being a lake station.

CHARACTER OF SHORES.—Low shores, generally swampy and shallow.

EXTREMES OF STAGE.—Maximum stage during period of observation, 3.48 m. on December 30, 1910; minimum stage, 0.68 m. on April 20, 1912.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—To study the fluctuations of water level.

ACCURACY.—The datum utilized from September 13, 1911, does not seem to be in accord with the datum of the previous records. However, there are no data on hand whereby the seeming errors might be adjusted.

Daily and monthly gage heights, in meters, of Bato Lake near Bato, Bato, Camarines Sur, for the year 1910

Day	January	February	March	April	May	June	July	August	September	October	November	December
1									1.22	2.46	2.08	2.88
2									1.19	2.40	2.53	2.76
3									1.16	2.32	2.96	2.76
4									1.16	2.32	2.96	2.76
5									1.16	2.32	2.96	2.76
6									1.22	2.32	2.96	2.92
7									1.22	2.32	2.96	2.92
8									1.24	2.32	2.96	2.92
9									1.24	2.32	2.96	2.92
10									1.30	2.32	2.96	2.92
11									1.36	2.32	2.96	2.92
12									1.36	2.32	2.96	2.92
13									1.36	2.32	2.96	2.92
14									1.40	2.32	2.96	2.92
15									1.40	2.32	2.96	2.92
16									1.40	2.32	2.96	2.92
17									1.40	2.32	2.96	2.92
18									1.40	2.32	2.96	2.92
19									1.40	2.32	2.96	2.92
20									1.40	2.32	2.96	2.92
21									1.40	2.32	2.96	2.92
22									1.40	2.32	2.96	2.92
23									1.40	2.32	2.96	2.92
24									1.40	2.32	2.96	2.92
25									1.40	2.32	2.96	2.92
26									1.40	2.32	2.96	2.92
27									1.40	2.32	2.96	2.92
28									1.40	2.32	2.96	2.92
29									1.40	2.32	2.96	2.92
30									1.40	2.32	2.96	2.92
31									1.40	2.32	2.96	2.92
Maximum									2.41	3.35	3.26	3.48
Minimum									1.02	2.09	2.08	2.38
Mean									1.59	2.81	2.77	2.77

Daily and monthly gage heights, in meters, of Bato Lake near Bato, Camarines Sur, for the year 1911

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	3.43	1.80	1.94	1.46	1.62	1.33	1.71			1.56	1.08	1.00
2	3.38	1.76	1.93	1.44	1.64	1.30	2.61			1.54	1.06	1.00
3	3.31	1.72	1.92	1.43	1.64	1.28	2.97			1.52	1.05	1.00
4	3.25	1.68	1.90	1.42	1.64	1.26	2.99			1.50	1.04	1.00
5	3.20	1.64	1.87	1.40	1.66	1.23	2.98			1.48	1.02	1.00
6	3.14	1.59	1.84	1.38	1.68	1.19	2.98			1.46	1.00	1.00
7	3.08	1.58	1.81	1.36	1.72	1.16	2.98			1.45	1.00	.99
8	3.00	1.55	1.78	1.36	1.74	1.14	2.98			1.44	1.00	.99
9	2.94	1.51	1.75	1.36	1.72	1.12	2.98			1.42	1.00	.99
10	2.90	1.48	1.72	1.36	1.70	1.10	2.99			1.40	.99	.99
11	2.93	1.46	1.69	1.35	1.70	1.08	3.00			1.40	.99	.99
12	2.82	1.45	1.70	1.35	1.68	1.06	8.14			1.36	.98	.98
13	2.76	1.46	1.71	1.34	1.66	1.04	3.34		1.52	1.34	.96	.98
14	2.70	1.45	1.70	1.32	1.64	1.02			1.50	1.34	.95	.97
15	2.64	1.48	1.68	1.30	1.62	1.00			1.49	1.33	.96	.98
16	2.58	1.49	1.66	1.28	1.62	.98			1.49	1.34	.98	.99
17	2.52	1.50	1.65	1.27	1.62	.98			1.48	1.32	.99	.99
18	2.46	1.52	1.64	1.26	1.56	1.00			1.48	1.30	.99	.99
19	2.40	1.56	1.62	1.25	1.52	1.01			1.48	1.28	1.00	.99
20	2.34	1.62	1.60	1.24	1.50	1.01			1.48	1.26	1.01	1.00
21	2.28	1.69	1.61	1.23	1.52	1.00			1.53	1.24	1.01	1.00
22	2.24	1.76	1.60	1.22	1.50	.99			1.53	1.22	1.01	.99
23	2.18	1.80	1.57	1.20	1.50	.99			1.58	1.20	1.01	.99
24	2.14	1.78	1.54	1.18	1.48	.99			1.58	1.18	1.00	.98
25	2.08	1.81	1.52	1.17	1.46	.98			1.62	1.16	1.00	.98
26	2.04	1.84	1.50	1.16	1.44	.98			1.60	1.14	.99	.97
27	2.00	1.90	1.51	1.15	1.42	.97			1.62	1.12	.99	.97
28	1.96	1.94	1.51	1.14	1.40	.96			1.62	1.12	.98	.96
29	1.90	1.90	1.50	1.13	1.38	.96			1.58	1.12	.98	.96
30	1.87	1.87	1.50	1.13	1.36	1.00			1.58	1.12	.98	.96
31	1.84	1.84	1.48	1.13	1.34	1.00			1.56	1.10	.98	.96
Maximum	3.43	1.94	1.94	1.85	1.74	1.33	8.34		1.62	1.56	1.08	1.00
Minimum	1.84	1.45	1.48	1.36	1.34	.96	1.71		1.48	1.10	.95	.96
Mean	2.59	1.64	1.68	1.62	1.57	1.07	2.89		1.54	1.32	1.00	.99

Daily and monthly gage heights, in meters, of Bato Lake near Bato, Bato, Camarines Sur, for the year 1912

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.	.96	.98	1.00	.79								
2.	.95	.98	.98	.78								
3.	.95	.98	.97	.77								
4.	.95	.97	.97	.76								
5.	.96	.97	.96	.75								
6.	.96	.97	.96	.75								
7.	.97	.97	.97	.74								
8.	.94	.97	.94	.74								
9.	.94	.97	.94	.73								
10.	.97	.96	.93	.73								
11.	.97	.96	.92	.72								
12.	.99	.96	.91	.72								
13.	.95	.95	.90	.71								
14.	1.01	.95	.90	.70								
15.	1.02	.95	.90	.70								
16.	1.04	.95	.90	.70								
17.	1.04	.94	.88	.70								
18.	1.04	.94	.88	.69								
19.	1.04	.93	.86	.69								
20.	1.03	.96	.86	.68								
21.	1.03	.96	.86									
22.	1.02	1.03	.86									
23.	1.02	.84	.84									
24.	1.01	1.04	.85									
25.	1.01	1.04	.84									
26.	1.00	1.03	.83									
27.	1.00	1.02	.82									
28.	1.00	1.02	.81									
29.	1.00	1.01	.81									
30.	1.00	.80	.80									
31.	.99	.79	.79									
Maximum	1.04	1.04	1.00	.79								
Minimum	.94	.93	.79	.68								
Mean	1.00	.98	.89	.73								

## CAMARINES SUR PROVINCE

## BICOL RIVER, NABUA

LOCATION.—About 500 m. downstream from an old bamboo bridge on the road to Santo Domingo about 6 km. from Nabua.

RECORDS AVAILABLE.—From October 18, 1910, to February 17, 1912.

GAGE.—Standard metric gage horizontally set at left bank of river. Chain and weight used for measuring the water surface fluctuations.

DISCHARGE MEASUREMENTS.—Made from boat at 200 m. above gage.

CHANNEL AND BANKS.—Channel only one at all stages; straight for about 200 m. above and several hundred meters below gaging section. Both banks wooded, high, yet subject to overflow. Stream bed sandy. Flow sluggish.

EXTREMES OF DISCHARGE.—Maximum discharge during period of observation, 200,000 second-liters on July 15, 1911; minimum discharge, 10,200 second-liters on January 7-8, 1912.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Records beginning only from October 18, 1910 and ending February 17, 1912, utilized. The rest of data can not be warranted to be very reliable.

*Discharge measurements of Bicol River, near Santo Domingo, Nabua,  
Camarines Sur*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1910</b>				
October 20.	J. I. Quinn	3 31	84,710	
October 26.	do	2 81	71,710	
October 26.	do	2 81	72,070	
October 31.	do.	2 45	59,740	
October 31	do.	2 45	57,130	
November 4	do.	3 39	104,403	
November 7	do.	3 29	93,680	
November 18.	do	3 09	71,500	
December 2	do	3 39	77,800	
December 2	do	3 39	75,400	
<b>1911</b>				
January 7	do	3.76	95,920	
January 16	do.	3 16	72,550	
January 28	do.	2.33	54,220	
February 4	C. O. Brown	2 00	39,160	
February 7	do.	1 84	39,580	
February 13	do	1 70	31,286	
February 16	do	1.76	34,846	
February 20	do	2 00	36,250	
March 1	do.	2 48	44,606	
March 6	do	2 30	43,800	
March 20.	do.	1.82	37,243	
March 23	do	1.77	33,452	
April 3	do.	1.51	30,480	
April 11	do.	2.00	40,330	
April 19	do.	1.90	41,540	
April 25	do.	1 88	33,350	
May 9	do.	2.01	43,810	
May 22	do.	1 87	47,330	
June 7	do.	1 32	24,750	
June 16	do.	1.18	19,330	
July 6	do.	3.73	90,650	
August 5	do	3 42	89,020	
August 17	do.	2.34	41,240	
August 29	do.	2 69	56,130	

*Discharge measurements of Bicol River, near Santo Domingo, Nabua,  
Camarines Sur—Continued*

Date	Made by—	Gage height (meters)	Discharge (second- liters)	Remarks
<b>1911</b>				
September 13. . . . .	C. O. Brown . . . . .	1.72	32,720	.. . . .
September 28. . . . .	do. . . . .	1.79	36,470	.. . . .
October 14. . . . .	do. . . . .	1.26	21,150	.. . . .
October 18. . . . .	do. . . . .	1.27	22,000	.. . . .
December 13. . . . .	do. . . . .	.77	14,450	.. . . .
December 21. . . . .	do. . . . .	.74	15,190	.. . . .
<b>1912</b>				
January 8. . . . .	do. . . . .	.63	10,090	.. . . .
January 13. . . . .	do. . . . .	.66	12,420	.. . . .
January 23. . . . .	do. . . . .	.75	12,690	.. . . .
February 9. . . . .	do. . . . .	.66	14,600	.. . . .
February 17. . . . .	do. . . . .	.69	13,220	.. . . .
February 24. . . . .	do. . . . .	.89	10,810	.. . . .
March 1. . . . .	do. . . . .	.83	4,210	.. . . .
March 9. . . . .	do. . . . .	.72	3,430	.. . . .
March 15. . . . .	do. . . . .	.68	2,840	.. . . .

*Daily and monthly discharges, in liters per second, of Bicol River near Santo Domingo, Nabua, Camarines Sur,  
for the year 1910*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....											58,300	82,600
2.....											71,100	74,800
3.....											95,000	77,200
4.....											106,800	79,100
5.....											101,650	83,100
6.....											108,800	82,700
7.....											95,600	81,700
8.....											86,000	78,000
9.....											82,000	76,600
10.....											77,700	74,200
11.....											73,800	72,200
12.....											80,100	69,200
13.....											81,200	67,400
14.....											79,200	65,600
15.....											77,200	63,000
16.....											74,500	62,700
17.....											72,000	62,300
18.....											70,000	62,700
19.....											83,300	61,300
20.....											87,400	59,600
21.....											100,400	65,600
22.....											104,000	69,300
23.....											109,000	76,200
24.....											108,000	83,900
25.....											107,700	81,500
26.....											98,500	86,500
27.....											90,800	86,500
28.....											86,000	112,400
29.....											86,000	120,000
30.....											.....	118,000
31.....											109,000	120,000
Maximum.....											58,300	59,600
Minimum.....											87,022	78,323
Mean.....												

NOTE.—Records from September 1 to October 17 have not been included due to unreliability of discharges obtained.



*Daily and monthly discharges, in liters per second, of Bicol River near Santo Domingo, Nabua, Camarines Sur,  
for the year 1911*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	117,000	45,200	44,200	31,100	33,600	32,300	55,000	106,000	53,300	33,000	18,500	15,600
2.....	113,000	42,600	41,400	30,600	34,600	31,100	80,500	99,000	50,500	32,100	17,500	15,600
3.....	108,700	40,200	41,100	30,100	35,400	29,900	95,400	93,400	48,000	31,700	17,300	15,400
4.....	106,200	37,500	44,500	30,000	36,600	28,400	98,000	92,000	45,600	30,000	16,900	15,000
5.....	103,000	38,000	43,800	29,000	38,700	27,000	96,000	88,000	43,400	29,800	16,800	14,600
6.....	98,600	38,600	43,800	28,400	40,400	27,000	92,000	82,800	41,200	29,200	16,200	14,800
7.....	94,500	39,100	42,700	27,700	43,800	25,300	90,200	78,000	39,500	28,300	16,000	14,500
8.....	92,400	36,600	41,800	26,800	43,800	24,300	88,700	73,000	38,800	27,500	17,000	14,500
9.....	88,800	34,600	40,400	26,800	43,600	23,400	86,000	68,400	37,200	26,600	16,500	14,400
10.....	87,200	33,300	39,200	26,800	44,600	22,800	88,400	65,400	35,800	25,600	16,200	14,000
11.....	84,300	31,800	37,800	25,600	45,000	22,300	94,000	61,800	34,500	24,700	15,200	14,600
12.....	83,500	32,700	37,600	25,600	45,000	22,600	103,500	57,700	33,400	24,300	15,600	14,400
13.....	82,000	30,900	41,200	24,400	45,000	20,000	126,000	53,200	32,800	24,000	15,600	14,000
14.....	78,400	31,600	38,400	24,400	44,400	20,700	146,000	49,600	32,200	23,700	16,200	14,000
15.....	77,200	33,800	38,500	24,400	44,400	19,800	200,000	46,400	31,400	23,500	15,900	13,800
16.....	74,600	34,700	37,800	23,800	44,500	19,000	195,000	43,500	31,200	23,200	16,500	13,600
17.....	72,400	34,200	39,500	22,200	44,400	19,000	180,000	40,900	31,700	24,000	16,700	14,600
18.....	71,100	35,000	39,000	21,600	45,000	19,600	170,000	38,800	32,300	24,300	16,200	14,300
19.....	68,000	36,200	37,800	21,700	44,200	19,400	165,000	35,800	32,300	24,100	17,000	14,300
20.....	67,000	36,600	37,200	20,200	47,200	19,400	160,000	33,800	31,700	23,100	17,800	14,300
21.....	64,400	38,000	35,600	19,900	48,000	18,800	156,600	33,800	31,800	22,700	17,800	15,000
22.....	62,400	39,000	35,600	18,000	48,100	18,300	150,000	36,200	35,300	22,300	17,800	15,000
23.....	60,900	40,200	33,200	17,700	46,000	17,700	142,000	35,300	32,400	22,000	16,500	14,900
24.....	59,800	40,700	32,000	16,000	44,000	17,400	136,500	35,300	32,400	21,500	16,500	13,900
25.....	55,000	42,600	31,400	15,700	43,700	17,300	127,000	35,300	32,400	20,700	16,500	13,900
26.....	57,600	40,600	33,700	14,000	42,000	16,500	125,000	36,400	32,400	20,400	16,500	13,900
27.....	59,800	41,700	32,700	13,700	38,900	16,200	121,600	34,000	32,400	19,600	16,200	13,100
28.....	56,800	42,400	32,400	13,400	38,400	16,000	119,500	33,300	32,400	19,000	15,900	12,600
29.....	52,000	44,900	32,200	13,400	36,500	16,000	115,400	31,400	35,300	19,000	15,600	12,000
30.....	49,100	.....	32,400	13,000	36,500	16,200	111,000	55,600	34,000	19,500	15,300	12,200
31.....	45,100	.....	31,800	.....	33,300	16,200	109,800	55,600	.....	18,800	.....	11,600
Maximum.....	117,000	45,200	44,500	45,500	48,100	32,300	200,000	106,000	53,300	33,000	18,500	15,600
Minimum.....	45,100	30,900	31,400	26,800	33,300	16,000	55,000	38,800	31,200	18,800	15,300	11,600
Mean.....	77,103	37,618	37,594	35,853	41,751	21,597	123,536	65,774	36,867	24,474	16,560	14,074

*Daily and monthly discharges, in liters per second, of Bicol River near Santo Domingo Nabua, Camarines Sur, for the year 1912*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	11,200	13,400	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2.....	13,200	13,200	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
3.....	10,800	13,500	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
4.....	10,800	13,300	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
5.....	11,600	14,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
6.....	11,600	14,400	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
7.....	10,200	14,100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
8.....	10,400	14,600	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
9.....	10,200	14,400	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
10.....	10,700	14,400	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
11.....	11,200	14,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
12.....	12,100	14,200	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
13.....	12,900	13,600	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
14.....	13,700	13,200	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
15.....	14,100	13,300	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
16.....	14,300	13,600	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
17.....	14,000	13,200	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
18.....	13,700	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
19.....	13,300	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
20.....	12,800	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
21.....	13,200	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
22.....	12,500	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
23.....	12,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
24.....	12,300	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
25.....	12,200	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
26.....	13,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
27.....	12,900	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
28.....	12,800	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
29.....	12,700	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
30.....	12,800	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
31.....	13,500	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maximum.....	14,300	14,600	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Minimum.....	10,200	13,200	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mean.....	12,197	13,777	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

NOTE.—Old records show gage heights up to March 31, but due to unreliability of discharges corresponding thereto, same have not been included.

## CAMARINES SUR PROVINCE

## BUHI LAKE, BUHI

LOCATION.—About 200 m. from right bank of the Barit River, the outlet of the lake.

RECORDS AVAILABLE.—From August 15, 1910, to April 20, 1912.

GAGE.—Standard metric gage fastened vertically to a tree.

DISCHARGE MEASUREMENTS.—None made being a lake station.

CHARACTER OF SHORES.—Very steep shores surrounded by mountains; covered with vegetation, trees, and hemp.

EXTREMES OF STAGE.—Maximum stage during period of observation, 2.00 m. on December 25, 1910; minimum stage, 0.36 m. on April 9–12, 1912.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—To study the fluctuations of water level.

ACCURACY.—There being no breaks in the record the heights shown seem reliable.

Daily and monthly gage heights, in meters, of Buhi Lake near Buhi, Camarines Sur, for the year 1910

Day	January	February	March	April	May	June	July	August	September	October	November	December
1									.47	.70		.88
2									.46	.68	1.22	.88
3									.45	.84	1.36	.96
4									.46	.88	1.30	1.27
5									.50	.86	1.26	1.44
6									.51	.84	1.20	1.43
7									.50	.80	1.12	1.39
8									.49	.76	1.06	1.34
9									.49	.78	1.02	1.29
10									.48	.76	.99	1.24
11									.48	.74	.94	1.21
12									.53	.76	.86	1.16
13									.53	.72	.99	1.09
14									.52	.70	1.00	1.06
15								.47	.53	.64	1.00	1.06
16								.48	.54	.66	.96	1.06
17								.47	.55	.64	.94	1.10
18								.47	.54	.62	.90	1.08
19								.46	.54	.60	.88	1.05
20								.45	.54	.58	.88	1.01
21								.46	.56	.60	.88	1.04
22								.45	.56	.60	1.19	1.18
23								.45	.56	.58	1.25	1.60
24								.45	.54	.56	1.22	1.83
25								.44	.53	.54	1.19	2.00
26								.43	.53	.52	1.16	1.96
27								.43	.53	.50	1.12	1.87
28								.42	.66	.52	1.08	1.98
29								.42	.68	.54	1.03	1.90
30								.46	.71	.56	.94	1.80
31								.46	.71	.59		
Maximum								.48	.71		1.36	2.00
Minimum								.42	.45	.50	.86	.88
Mean								.45	.53	.69	1.07	1.34

Daily and monthly gage heights, in meters, of Buhi Lake near Buhi, Camarines Sur, for the year 1911

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	1.70	.76	1.28	.81	.72	.53	.75	.80	.73	.69	.56	.64
2	1.60	.72	1.24	.78	.69	.51	1.02	.78	.72	.69	.56	.64
3	1.52	.70	1.18	.75	.72	.51	1.07	.76	.71	.68	.56	.63
4	1.48	.68	1.11	.71	.70	.50	.93	.72	.70	.67	.54	.63
5	1.38	.66	1.08	.68	.70	.50	.89	.72	.70	.66	.55	.62
6	1.29	.66	1.04	.68	.70	.49	.85	.71	.69	.66	.59	.62
7	1.26	.66	1.02	.70	.70	.49	.82	.70	.68	.65	.61	.63
8	1.25	.64	1.00	.70	.70	.48	.82	.68	.68	.65	.60	.63
9	1.23	.64	.99	.75	.70	.47	.80	.67	.68	.64	.59	.63
10	1.19	.64	.96	.86	.69	.46	.80	.66	.69	.64	.58	.63
11	1.15	.76	.94	.84	.68	.46	.79	.66	.69	.63	.57	.62
12	1.11	.84	1.00	.88	.68	.47	.90	.66	.68	.64	.59	.62
13	1.08	.86	.98	.82	.66	.47	1.22	.66	.68	.64	.58	.65
14	1.08	.90	.96	.80	.66	.46	1.30	.66	.68	.64	.58	.65
15	1.04	.94	.93	.78	.62	.46	1.29	.61	.68	.63	.64	.63
16	1.02	.98	.90	.76	.61	.46	1.24	.64	.70	.63	.64	.63
17	1.00	1.04	.80	.75	.61	.47	1.18	.67	.70	.63	.64	.63
18	.96	1.08	.86	.76	.60	.48	1.16	.73	.69	.64	.62	.67
19	.94	1.20	.84	.75	.58	.48	1.11	.76	.72	.62	.62	.68
20	.92	1.30	.82	.74	.60	.47	1.07	.78	.72	.62	.62	.68
21	.88	1.46	.82	.77	.62	.46	1.02	.83	.74	.62	.61	.67
22	.86	1.40	.80	.83	.62	.46	1.00	.82	.74	.61	.60	.66
23	.84	1.36	.79	.83	.59	.45	.98	.80	.73	.61	.60	.66
24	.82	1.36	.80	.86	.58	.45	.91	.78	.72	.61	.59	.66
25	.80	1.37	.83	.78	.57	.45	.88	.77	.72	.60	.58	.65
26	.78	1.32	.86	.76	.56	.44	.87	.76	.71	.60	.57	.65
27	.76	1.32	.88	.76	.56	.43	.84	.76	.70	.58	.56	.64
28	.76	1.32	.88	.76	.56	.43	.84	.76	.70	.58	.56	.64
29	.76	1.32	.88	.76	.56	.43	.84	.76	.70	.58	.56	.64
30	.74	1.32	.86	.74	.53	.45	.82	.74	.70	.58	.56	.64
31	.74	1.32	.84	.....	.53	.....	.82	.74	..	.58	..	.63
Maximum	1.70	1.46	1.28	.86	.72	.53	1.30	.82	.74	.69	.64	.68
Minimum	.74	.64	.78	.67	.53	.43	.75	.64	.68	.63	.54	.62
Mean	1.08	1.00	.94	.77	.64	.47	.97	.73	.70	.63	.59	.66

*Daily and monthly gage heights, in meters, of Buhi Lake near Buhi, Camarines Sur, for the year 1912*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	.63	.59	.76	.41								
2	.62	.59	.74	.41								
3	.62	.58	.72	.40								
4	.62	.58	.70	.39								
5	.62	.57	.68	.38								
6	.62	.57	.66	.38								
7	.61	.56	.64	.37								
8	.64	.56	.62	.37								
9	.64	.56	.60	.36								
10	.63	.55	.60	.36								
11	.62	.55	.58	.36								
12	.64	.54	.58	.36								
13	.65	.54	.56	.37								
14	.64	.54	.54	.41								
15	.64	.55	.54	.41								
16	.64	.55	.52	.41								
17	.63	.55	.52	.41								
18	.62	.56	.50	.41								
19	.62	.56	.50	.41								
20	.62	.62	.51	.41								
21	.62	.84	.50									
22	.61	.90	.50									
23	.62	.90	.48									
24	.62	.90	.47									
25	.61	.87	.46									
26	.61	.85	.45									
27	.61	.83	.45									
28	.60	.80	.45									
29	.60	.74	.45									
30	.60		.43									
31	.59		.42									
Maximum	.65	.90	.76	.41								
Minimum	.59	.54	.42	.36								
Mean	.62	.65	.55	.39								

## CAMARINES SUR PROVINCE

## COLASI RIVER, GOA

**LOCATION.**—About 500 m. from main street of Goa at the first bridge from Goa on the Goa-San Jose Road.

**RECORDS AVAILABLE.**—From March 16, 1919, to December 31, 1922. Also from December 10, 1910, to April 20, 1912, inclusive, at the same location with breaks in the records from December 17, 1911, to January 31, 1912.

**GAGE.**—Made of two sections, the lower section is of an inclined type reading from 0 to 1.20 m. fastened to large stone in bored holes. The upper section is standard metric-gage board reading from 1.20 m. to 2.50 m. fastened to a left abutment of bridge.

**DISCHARGE MEASUREMENTS.**—Made by wading at low water; from bridge at high water.

**CHANNEL AND BANKS.**—Channel is straight for 10 m. above and below gaging section; banks high and covered with bushes. At measuring section stream bed is composed of gravel and sand and, therefore, shifting. Uniform flow can be obtained by cleaning bed of large boulders and placing low concrete control about 2 m. below gaging section.

**EXTREMES OF DISCHARGE.**—Maximum discharge recorded during period of observation, 10,621 second-liters on December 23, 1910; minimum discharge, 6 second-liters on February 2, 1912.

**DIVERSIONS.**—None.

**REGULATION.**—None.

**UTILIZATION.**—For irrigation purposes.

**ACCURACY.**—Discharge for December 10, 1910, to April 20, 1912, and from March 16 to December 31, 1919, are determined from fairly well-defined curves. Discharge from January 1 to December 31, 1920, from poorly defined rating curve, from January 3, 1921, to December 31, 1922, from fairly well-defined rating curve. Gage readings for 1919-1920 rather doubtful; read twice daily.

*Discharge measurements of Colasi River, near Colasi Bridge, Goa,  
Camarines Sur*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1910</b>				
May 5.....	J. I. Quinn.....	1 02	600	
December 9 .....	W. Demers .....	1.02	870	
<b>1911</b>				
January 2.....	do.....	1 11	1,710	
January 2.....	do.....	1 15	1,620	
February 10.....	do.....	1 01	445	
March 13.....	do.....	1 07	720	
April 12.....	do.....	1 05	540	
April 13.....	do.....	1 76	1,170	
June 2.....	do.....	1 03	600	
June 26.....	do.....	1 00	430	
August 26.....	do.....	1 05	310	
<b>1919</b>				
April 8.....	A. Fegarido.....	.20	160	
April 10.....	do.....	.21	180	
April 30.....	do.....	.20	150	
May 8.....	do.....	.20	170	
June 12.....	do.....	.23	210	
June 14.....	do.....	.23	200	

**NOTE.**—Gage heights from April 8, 1919, referred to a different datum.

*Discharge measurements of Colasi River, near Colasi Bridge, Goa,  
Camarines Sur—Continued*

Date	Made by—	Gage height (meters)	Discharge (second- liters)	Remarks
<b>1919</b>				
August 8	do.	.24	240	
August 12	do.	.48	500	
September 9	do.	.23	200	
September 11	do.	.25	220	
October 16	do.	.25	260	
October 17	do.	.23	200	
November 12	do.	.25	290	
November 13	do.	.25	320	
November 20	do.	.44	380	
December 4	do.	.43	430	
December 5	do.	.50	570	
December 6	do.	.38	380	
December 26	do.	.32	490	
<b>1920</b>				
January 2	M. B. Canas	.33	410	
January 23	do.	.32	360	
February 11	do.	.28	340	
March 11	do.	.26	370	
March 12	do.	.26	280	
April 15	do.	.22	150	
May 11	do.	.29	380	
May 12	do.	.25	170	
June 11	do.	.22	200	
July 24	M. B. Canas and O. Buenaventura	.24	240	
July 26	do.	.23	210	
August 9	do.	.21	150	
August 10	do.	.19	107	
August 19	do.	.24	166	
August 25	do.	.19	118	
September 8	do.	.20	115	
September 9	do.	.19	107	
September 20	do.	.24	169	
September 21	do.	.27	220	
October 9	do.	.22	141	
October 26	do.	.29	248	
November 9	do.	.26	200	
November 24	do.	.27	223	
December 7	do.	.30	323	
December 8	do.	.34	421	
December 25	do.	.25	211	
<b>1921</b>				
January 10	do.	.16	792	
January 27	do.	.23	155	
February 11	do.	.26	207	
February 24	do.	.34	458	
March 15	do.	.30	322	
March 28	do.	.25	205	
April 9	do.	.26	209	
April 25	do.	.24	186	
May 6	do.	.22	171	
June 20	do.	.31	332	
July 21	do.	.28	255	
August 16	do.	.30	322	
September 26	do.	.23	160	
October 31	do.	.34	507	
November 18	do.	.35	556	
December 13	do.	.40	793	
December 14	do.	.58	1,898	
December 26	do.	.53	1,668	
<b>1922</b>				
January 7	O. Buenaventura and S. Musa	.38	747	
January 20	O. Buenaventura	.36	569	
February 17	do.	.29	303	
March 9	do.	.30	292	
March 27	do.	.30	260	
April 7	do.	.28	189	
April 22	do.	.28	228	
May 9	do.	.28	193	
May 18	do.	.36	408	
May 27	do.	.30	311	



*Discharge measurements of Colasi River, near Colasi Bridge, Goa,  
Camarines Sur—Continued*

Date	Made by—	Gage height (meters)	Discharge (second- liters)	Remarks
<b>1922</b>				
June 26.....	do.....	.28	194	.....
July 12.....	do.....	.28	187	.....
August 9.....	do.....	.36	366	.....
August 23.....	do.....	.28	238	.....
August 23.....	do.....	.28	248	.....
August 30.....	do.....	.26	210	.....
September 13.....	do.....	.25	236	.....
September 22.....	do.....	.34	617	.....
September 23.....	do.....	.38	771	.....
October 2.....	do.....	.35	666	.....
October 14.....	do.....	.32	403	.....
October 20.....	do.....	.32	417	.....
October 28.....	do.....	.28	291	.....
November 2.....	do.....	.30	348	.....
November 18.....	do.....	.29	288	.....
December 5.....	do.....	.45	827	.....
December 16.....	do.....	.35	513	.....

*Daily and monthly discharges, in liters per second, of Colasi River near Poblacion, Goa, Camarines Sur, for the year 1910*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....												
2.....												
3.....												
4.....												
5.....												
6.....												
7.....												
8.....												
9.....												
10.....												672
11.....												546
12.....												546
13.....												546
14.....												546
15.....												672
16.....												546
17.....												746
18.....												812
19.....												672
20.....												1,508
21.....												2,431
22.....												10,621
23.....												4,771
24.....												5,551
25.....												5,291
26.....												2,691
27.....												4,251
28.....												2,691
29.....												2,431
30.....												1,939
31.....												10,621
Maximum.....												10,621
Minimum.....												546
Mean.....												2,294

NOTE.—Daily discharges determined from fairly well-defined rating curves, applicable only for discharges above 400 second-liters and below 1,600 second-liters. Above and below these limits, values are estimated from extension of curve.

Daily and monthly discharges, in liters per second, of Colasi River near Poblacion, Goa, Camarines Sur, for the year 1911

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	1,822	436	1,717	.....	889	607	672	987	546	48	108	341
2.....	1,410	436	1,508	672	1,133	607	1,410	987	607	48	108	341
3.....	1,133	436	1,508	607	1,967	607	1,133	814	672	85	108	341
4.....	1,133	436	1,314	742	672	546	1,967	814	672	65	85	341
5.....	1,048	436	1,133	672	672	489	889	742	222	108	85	341
6.....	1,048	546	1,133	672	672	489	889	742	190	85	190	299
7.....	967	546	1,048	607	889	436	814	672	190	85	814	260
8.....	1,048	489	967	1,048	814	436	814	672	190	85	672	260
9.....	967	489	967	1,314	814	546	814	672	190	85	672	341
10.....	814	436	967	967	814	607	672	546	190	65	607	299
11.....	814	672	1,133	814	742	672	436	489	190	85	546	341
12.....	814	672	1,133	814	742	672	436	387	180	85	489	341
13.....	889	607	814	672	672	742	1,967	387	180	85	489	341
14.....	742	672	814	672	742	607	1,612	436	169	85	387	341
15.....	814	672	814	607	672	546	2,301	436	133	85	436	341
16.....	814	967	814	607	2,055	489	2,301	436	108	85	341	341
17.....	889	889	814	672	1,133	436	1,959	546	48	65	341	.....
18.....	672	1,612	814	672	889	546	1,717	436	48	85	341	.....
19.....	672	4,251	814	672	814	546	1,508	436	65	85	341	.....
20.....	546	2,431	742	672	742	489	1,314	436	48	85	341	.....
21.....	546	2,301	672	742	672	436	1,314	436	48	85	387	.....
22.....	646	2,175	672	742	672	436	1,133	546	48	86	341	.....
23.....	607	1,939	672	967	672	436	1,048	672	48	65	341	.....
24.....	672	2,308	607	967	672	436	1,048	672	48	65	341	.....
25.....	672	2,308	607	967	607	436	1,048	672	108	65	299	.....
26.....	546	3,311	4,511	814	814	436	1,967	672	.....	65	299	.....
27.....	546	2,431	.....	814	672	436	814	672	546	85	299	.....
28.....	436	1,822	.....	814	546	436	814	672	546	85	299	.....
29.....	436	.....	.....	814	546	436	967	607	133	85	260	.....
30.....	489	.....	.....	672	546	341	967	546	108	108	260	.....
31.....	489	4,251	.....	.....	546	.....	889	546	108	108	299	.....
Maximum	1,822	4,251	4,511	1,314	2,055	742	2,951	987	672	108	814	341
Minimum	436	436	607	607	546	341	436	387	48	48	48	260
Mean	804	1,318	1,100	775	786	511	1,109	643	232	78	338	317

NOTE.—See footnote to daily discharge for 1910.

Daily and monthly discharges, in liters per second, of Colasi River near Poblacion, Goa, Camarines Sur, for the year 1912

Day	January	February	March	April	May	June	July	August	September	October	November	December
1		11	489	436								
2		16	546	436								
3		11	436	436								
4		24	489	436								
5		48	546	489								
6		24	546	436								
7		24	546	436								
8		48	546	436								
9		48	546	436								
10		65	436	436								
11		48	436	546								
12		48	436	607								
13		48	489	436								
14		299	489	489								
15		489	489	546								
16		546	546	489								
17		489	546	607								
18		546	489	607								
19		546	546	742								
20		912	607	607								
21		672	546									
22		742	489									
23		546	607									
24		489	546									
25		436	546									
26		607	489									
27		607	489									
28		436	489									
29			546									
30			489									
31			489									
Maximum.		967	607	742								
Minimum.		6	436	436								
Mean.		327	517	504								

NOTE.—See footnote to daily discharge for 1910.

Daily and monthly discharges, in liters per second, of Colasi River near Colasi Bridge, Goa, Camarines Sur, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....				140	165	192	234	206	263	206	234	485
2.....				165	165	220	705	220	248	234	234	684
3.....				192	165	178	234	192	234	206	206	727
4.....				192	165	263	206	206	234	206	234	542
5.....				192	165	206	206	248	234	220	234	727
6.....				192	165	234	192	279	192	220	295	485
7.....				165	165	192	192	234	234	248	295	448
8.....				152	192	192	192	295	206	295	263	642
9.....				178	178	684	206	234	206	295	248	466
10.....				192	178	234	192	206	220	279	311	379
11.....				192	165	220	192	220	234	263	234	379
12.....				192	192	206	192	642	248	178	234	342
13.....				192	178	206	178	362	248	362	279	342
14.....				192	192	206	234	234	258	234	279	342
15.....				192	178	206	192	220	248	220	234	413
16.....			178	165	178	192	192	248	248	192	320	220
17.....			165	178	178	192	178	248	234	279	523	504
18.....			165	165	178	206	192	263	263	263	705	220
19.....			152	165	178	206	192	311	263	248	504	248
20.....			140	165	192	206	206	279	234	220	430	345
21.....			140	165	279	206	220	263	220	220	642	345
22.....			192	165	178	192	220	234	220	192	504	345
23.....			192	165	165	206	220	279	220	220	448	379
24.....			140	165	165	206	206	295	248	263	418	345
25.....			165	152	165	206	206	279	220	263	418	345
26.....			165	152	165	279	206	279	220	263	418	362
27.....			165	140	165	234	206	248	220	192	366	382
28.....			165	165	165	206	206	295	206	206	366	382
29.....			165	178	165	192	220	234	206	206	379	600
30.....			140	165	220	206	206	323	206	220	379	379
31.....			152	165	220	206	206	323	206	220	379	379
Maximum.....			192	192	279	684	705	642	328	396	975	727
Minimum.....			140	140	165	165	178	192	192	178	220	220
Mean.....			168	179	180	223	222	267	233	238	396	429

Daily and monthly discharges, in liters per second, of Colasi River near Colasi Bridge, Goa, Camarines Sur, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	345	345	220	192	248	192	192	295	248	206	311	2,001
2	448	311	279	192	248	192	192	192	165	192	413	448
3	396	279	220	192	220	192	192	192	192	220	2,001	220
4	448	295	248	178	220	192	192	192	192	178	2,001	220
5	448	279	248	178	220	192	192	192	192	192	2,001	220
6	430	295	248	178	220	192	192	192	192	192	2,001	220
7	379	279	248	206	248	192	192	192	192	206	248	311
8	362	234	220	206	248	192	192	192	192	206	248	311
9	362	248	220	206	248	192	192	192	192	206	248	311
10	362	248	220	206	248	192	192	192	192	206	248	311
11	362	248	220	206	248	192	192	192	192	206	248	311
12	362	248	220	206	248	192	192	192	192	206	248	311
13	362	248	220	206	248	192	192	192	192	206	248	311
14	362	248	220	206	248	192	192	192	192	206	248	311
15	362	248	220	206	248	192	192	192	192	206	248	311
16	362	248	220	206	248	192	192	192	192	206	248	311
17	362	248	220	206	248	192	192	192	192	206	248	311
18	362	248	220	206	248	192	192	192	192	206	248	311
19	362	248	220	206	248	192	192	192	192	206	248	311
20	362	248	220	206	248	192	192	192	192	206	248	311
21	362	248	220	206	248	192	192	192	192	206	248	311
22	362	248	220	206	248	192	192	192	192	206	248	311
23	362	248	220	206	248	192	192	192	192	206	248	311
24	362	248	220	206	248	192	192	192	192	206	248	311
25	362	248	220	206	248	192	192	192	192	206	248	311
26	362	248	220	206	248	192	192	192	192	206	248	311
27	362	248	220	206	248	192	192	192	192	206	248	311
28	362	248	220	206	248	192	192	192	192	206	248	311
29	362	248	220	206	248	192	192	192	192	206	248	311
30	362	248	220	206	248	192	192	192	192	206	248	311
31	362	248	220	206	248	192	192	192	192	206	248	311
Maximum	523	870	279	278	295	192	279	295	413	2,001	2,001	2,001
Minimum	263	234	165	178	178	192	192	165	140	165	206	220
Mean	379	365	213	199	219	192	202	191	201	392	331	340

NOTE.—Discharge for June, unreliable.

Daily and monthly discharges, in liters per second of Colasi River near Colasi Bridge, Goa, Camarines Sur, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	248	188	286	410	188	146	188	286	286	286	8,930	1,063
2.....	248	188	344	410	146	112	234	286	286	286	4,980	1,063
3.....	188	211	486	410	146	97	410	286	286	286	*572	936
4.....	188	234	486	410	146	146	666	286	286	286	8,410	936
5.....	188	234	528	410	146	146	314	286	286	286	3,650	1,130
6.....	188	234	572	260	146	146	234	314	286	286	4,210	1,063
7.....	211	286	572	234	146	146	234	286	286	286	3,000	1,063
8.....	211	286	572	234	146	146	234	286	286	286	3,000	936
9.....	211	286	486	286	146	146	211	286	286	286	4,470	822
10.....	234	234	410	211	146	188	188	286	286	286	10,280	716
11.....	234	234	410	188	146	188	188	286	410	286	8,670	716
12.....	146	234	572	188	146	234	234	286	410	286	5,340	716
13.....	146	286	486	188	146	234	234	286	618	286	3,710	666
14.....	188	286	572	188	146	286	234	344	572	286	1,518	2,170
15.....	234	234	572	188	410	286	234	344	260	344	572	1,436
16.....	211	286	572	188	260	286	188	344	260	286	618	1,278
17.....	211	286	286	188	188	286	234	286	286	286	572	1,203
18.....	146	286	286	188	166	286	286	234	286	286	528	936
19.....	188	286	286	188	188	344	286	234	286	286	528	936
20.....	188	286	286	146	188	286	286	234	286	286	528	936
21.....	146	286	286	146	188	286	286	286	286	286	528	936
22.....	188	234	234	146	166	234	286	286	286	344	3,000	936
23.....	188	234	234	146	146	234	286	286	286	286	5,340	1,518
24.....	188	377	377	146	146	234	286	286	286	344	3,690	1,130
25.....	188	666	716	144	146	234	286	286	286	344	3,840	3,710
26.....	188	572	572	144	146	234	286	286	188	344	3,990	2,390
27.....	166	572	572	144	146	234	286	286	286	344	1,602	1,356
28.....	188	260	260	188	188	234	286	286	286	314	877	1,278
29.....	344	260	234	188	146	234	286	286	286	314	1,063	1,203
30.....	234	.....	234	188	146	188	286	286	286	572	998	1,130
31.....	234	.....	286	..	146	.....	286	286	.....	528	.....	998
Maximum.....	344	666	716	410	410	344	666	344	618	572	10,280	3,710
Minimum.....	146	188	234	144	146	97	188	234	188	234	528	666
Mean.....	201	294	420	213	168	213	269	287	310	313	3,260	1,211

Note.—Discharge determined from fairly well-defined rating curve, applicable as follows: January 3, 1921, to March 8, 1922, fair below 3,000 second-liters; March 9 to December 31, 1922, fair below 900 second-liters.

\* Unreliable.

Daily and monthly discharges, in liters per second of Colasi River near Colasi Bridge, Goa, Camarines Sur, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	877	410	447	403	228	228	403	1 2293	122	507	228	2 076
2.....	877	377	344	269	228	228	356	696	155	507	155	1 865
3.....	763	340	286	269	228	228	356	453	93	403	311	1 584
4.....	716	344	286	269	228	403	403	403	91	356	311	1 380
5.....	666	486	286	269	228	269	228	403	155	403	228	1 119
6.....	666	410	344	311	228	269	228	564	155	403	311	1 380
7.....	716	377	314	228	228	269	191	564	155	403	311	1 380
8.....	666	377	314	228	228	269	191	507	155	507	311	1 042
9.....	666	377	356	311	228	269	228	627	155	453	311	1 042
10.....	666	377	403	228	228	269	403	507	122	453	311	1 042
11.....	572	377	403	228	403	228	403	403	93	403	269	1 042
12.....	822	410	311	228	228	311	228	311	93	403	269	1 119
13.....	666	410	403	228	228	311	228	311	93	403	269	1 119
14.....	618	410	311	228	311	228	228	311	93	403	311	945
15.....	677	344	311	228	311	228	228	311	191	403	311	945
16.....	666	344	311	228	311	403	228	311	155	453	311	1 119
17.....	666	344	311	228	311	403	228	311	155	453	311	1 119
18.....	666	286	507	228	627	403	228	228	269	403	311	945
19.....	618	286	311	228	311	311	228	228	269	403	311	945
20.....	618	286	356	228	311	356	228	269	311	356	311	945
21.....	618	286	356	228	311	356	311	269	311	356	311	945
22.....	618	344	356	191	403	228	311	507	627	311	771	1 641
23.....	618	344	356	191	403	228	696	228	696	311	507	1 380
24.....	572	344	311	311	311	269	403	228	1 032	311	403	1 641
25.....	572	286	356	311	311	228	696	228	1 032	228	453	1 728
26.....	528	286	356	269	311	228	696	228	1 554	403	453	1 728
27.....	572	286	356	228	311	311	696	228	1 554	228	1 293	4 860
28.....	486	314	311	228	311	228	627	228	1 696	228	3 838	1 728
29.....	447	269	269	228	228	228	627	228	696	228	5 643	1 728
30.....	410	269	269	228	228	311	453	191	564	191	2 163	2 511
31.....	410	269	269	228	228	311	771	155	564	155	3 150	3 150
Maximum	877	486	507	403	627	403	771	1 293	1 554	564	5 643	4 860
Minimum..	410	286	269	191	191	228	191	155	93	155	155	155
Mean	644	354	336	251	296	280	401	369	899	371	732	1 589

NOTE.—See footnote to daily discharge for 1921.



## CAMARINES SUR PROVINCE

## INARIHAN RIVER, CALABANGA

LOCATION.—In the barrio Santa Cruz about 5 km. northeast of Calabanga and about 900 m. southeast of the Calabanga-Tinambac trail.

RECORDS AVAILABLE.—From August 21, 1920, to December 31, 1922.

GAGE.—Vertical staff made from a .05 × .076 × 1.5 m. guijo, fastened on to a big tree at the left bank. It is painted white and graduated to read from 0 to 1.5 m.

DISCHARGE MEASUREMENTS.—Made by wading at section of gage.

CHANNEL AND BANKS.—Channel straight for about 70 m. above and 30 m. below the station. Both banks high and steep and subject to overflow only at extreme high water stages. Stream bed full of gravel and small boulders and is rather shifting.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 29,760 second-liters on November 25, 1921; minimum discharge, 666 second-liters on October 10, 1920.

DIVERSIONS.—One below the station.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge obtained from a fairly well-defined curve from 800 to 1,600 second-liters. Applicable up to October, 1921. Rating curves applicable throughout 1922, well-defined. Gage read twice daily.

*Discharge measurements of Inarihan River, near Santa Cruz, Calabanga, Camarines Sur*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1920</b>				
July 2	M. Canas and B. B. Buchanan		1,670	
August 6	B. B. Buchanan and O Buena Ventura		1,071	
August 21	O Buena Ventura	19	857	
September 7	do.	19	817	
September 22	do.	27	1,313	
October 25	do.	30	1,645	
November 8	do.	27	1,388	
November 23	do.	27	1,388	
December 6	do.	43	3,565	
December 24	do.	27	1,378	
<b>1921</b>				
January 11	do.	28	1,434	
January 26	do.	29	1,523	
February 10	do.	31	1,748	
February 23	do.	41	3,185	
March 14	do.	30	1,638	
March 26	do.	28	1,466	
April 18	do.	25	1,262	
April 26	do.	24	1,142	
May 7	do.	22	994	
June 16	do.	26	1,295	
June 17	do.	26	1,295	
June 25	do.	23	1,051	
July 19	do.	39	2,755	
August 10	do.	25	1,236	
August 18	do.	34	2,103	
September 8	do.	28	1,491	
September 9	do.	26	1,305	
September 9	do.	27	1,383	
September 24	do.	33	1,949	
October 8	do.	34	2,025	
November 9	do.	64	8,482	
November 23	S. Musa	80	13,176	
November 23	do.	92	17,764	
December 15	O. Buena Ventura	55	6,391	
December 27	do.	51	5,402	

*Discharge measurements of Inarihan River, near Santa Cruz, Calabunga,  
Camarines Sur—Continued*

Date	Made by—	Gage height (meters)	Discharge (second- liters)	Remarks
<b>1922</b>				
January 6 . . .	S. Musa and O. Buena- ventura	38	2,715	
January 6 . . .	do	40	3,070	
January 19 . . .	O. Buenaventura	38	2,699	
January 24 . . .	do	36	2,279	
February 7 . . .	O. Buenaventura and S. Musa	40	3,030	
February 16 . . .	O. Buenaventura	35	2,320	
February 27 . . .	do	31	1,787	
March 10 . . .	S. Musa and O. Buen- ventura	34	2,087	
March 11 . . .	O. Buenaventura and S. Musa	33	1,898	
March 28 . . . . .	O. Buenaventura	29	1,745	
April 18 . . . . .	do	27	1,392	
April 24 . . . . .	do	24	1,203	
May 6 . . . . .	do	25	1,276	
May 16 . . . . .	do	26	1,343	
May 16 . . . . .	do	25	1,253	
May 26 . . . . .	do	25	1,338	
June 6 . . . . .	W. Demers and O. Buen- ventura	25	1,222	
June 27 . . . . .	O. Buenaventura	24	1,189	
July 17 . . . . .	do	21	1,009	
July 30 . . . . .	do	22	1,098	
August 8 . . . . .	do	26	1,506	
August 24 . . . . .	do	21	1,344	
August 31 . . . . .	do	20	1,196	
September 12 . . . . .	do	22	1,241	
October 4 . . . . .	do	28	1,639	
October 13 . . . . .	do	26	1,497	
October 19 . . . . .	do	25	1,420	
October 27 . . . . .	do	26	1,567	
November 4 . . . . .	do	38	2,750	
November 17 . . . . .	do	28	1,680	
December 4 . . . . .	do	39	2,992	
December 8 . . . . .	do	36	3,027	
December 9 . . . . .	do	38	3,211	
December 15 . . . . .	do	33	2,824	

*Daily and monthly discharges, in liters per second, of Inaritan River near Santa Cruz, Calabanga, Camarines Sur,  
for the year 1920*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	..	..	..	..	..	..	..	..	1,558	1,088	1,390	1,308
2	..	..	..	..	..	..	..	..	1,472	1,390	1,390	1,472
3	..	..	..	..	..	..	..	..	1,644	1,644	1,644	1,644
4	..	..	..	..	..	..	..	..	1,890	1,472	3,550	2,004
5	..	..	..	..	..	..	..	..	1,018	1,472	3,798	2,004
6	..	..	..	..	..	..	..	..	890	1,390	3,058	2,200
7	..	..	..	..	..	..	..	..	1,018	1,390	1,472	2,502
8	..	..	..	..	..	..	..	..	890	1,308	1,912	1,644
9	..	..	..	..	..	..	..	..	774	890	1,390	1,644
10	..	..	..	..	..	..	..	..	890	890	1,308	1,308
11	..	..	..	..	..	..	..	..	832	665	1,158	1,308
12	..	..	..	..	..	..	..	..	832	890	1,158	1,390
13	..	..	..	..	..	..	..	..	832	1,018	1,018	1,308
14	..	..	..	..	..	..	..	..	1,820	1,820	1,158	1,308
15	..	..	..	..	..	..	..	..	832	4,046	1,308	1,308
16	..	..	..	..	..	..	..	..	832	6,774	1,390	2,608
17	..	..	..	..	..	..	..	..	832	9,750	1,390	2,938
18	..	..	..	..	..	..	..	..	832	5,534	1,390	2,826
19	..	..	..	..	..	..	..	..	890	3,178	1,558	1,644
20	..	..	..	..	..	..	..	..	890	7,766	1,308	1,472
21	..	..	..	..	..	..	..	890	890	7,022	1,472	1,308
22	..	..	..	..	..	..	..	720	1,472	2,200	1,472	1,308
23	..	..	..	..	..	..	..	720	1,644	1,644	1,390	1,308
24	..	..	..	..	..	..	..	774	4,666	1,644	1,390	1,308
25	..	..	..	..	..	..	..	1,308	5,038	1,712	1,308	1,308
26	..	..	..	..	..	..	..	1,018	2,732	1,472	1,233	1,308
27	..	..	..	..	..	..	..	1,018	4,532	1,472	1,390	1,233
28	..	..	..	..	..	..	..	1,658	2,238	1,472	1,644	1,233
29	..	..	..	..	..	..	..	6,151	2,238	1,472	1,390	1,233
30	..	..	..	..	..	..	..	4,790	1,472	1,588	1,472	1,233
31	..	..	..	..	..	..	..	2,714	1,158	1,390	..	1,233
Maximum	..	..	..	..	..	..	..	6,154	5,782	9,750	3,798	2,938
Minimum	..	..	..	..	..	..	..	720	774	665	1,018	1,233
Mean	..	..	..	..	..	..	..	2,355	1,719	2,505	1,577	1,606

*Daily and monthly discharges, in liters per second, of Inarthan River near Santa Cruz, Calabanga, Camarines Sur,  
for the year 1921*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	1,233	4,294	1,820	1,390	1,158	1,308	1,308	1,308	1,472	2,102	2,450	5,020
2	1,308	1,820	1,820	1,472	1,233	2,004	1,233	1,308	1,308	3,052	7,450	4,400
3	1,308	1,472	1,320	1,390	1,233	1,472	1,308	1,308	1,308	3,052	5,650	5,020
4	1,233	1,390	1,732	1,308	1,233	1,308	1,308	1,308	1,308	3,058	3,890	4,630
5	1,308	1,390	1,390	1,308	1,233	1,233	2,714	1,308	1,308	2,200	3,890	15,540
6	1,308	1,390	1,390	1,308	1,233	1,158	2,200	1,308	1,472	2,200	3,890	7,550
7	1,233	1,644	4,666	1,472	1,233	1,644	1,820	1,308	1,472	2,004	3,060	5,650
8	1,390	2,608	2,608	1,390	1,233	1,233	1,644	1,233	1,390	1,912	2,750	4,820
9	1,308	2,200	2,200	1,308	1,233	1,233	1,820	1,158	1,308	1,912	9,710	4,440
10	1,308	1,644	2,004	1,308	1,233	1,308	1,644	1,308	2,102	2,200	27,280	4,070
11	1,472	1,472	2,004	1,308	1,233	1,308	1,558	1,308	1,820	2,200	13,100	3,720
12	1,308	1,558	1,708	1,308	1,233	1,308	1,472	1,233	10,122	2,200	5,650	5,650
13	1,158	1,732	1,644	1,308	1,233	1,308	1,390	1,308	2,826	3,092	4,070	12,120
14	1,158	2,004	1,644	1,308	1,233	1,308	1,390	1,308	2,826	3,092	4,070	12,120
15	1,158	1,558	1,732	1,308	1,233	1,308	1,390	1,308	2,826	3,092	4,070	12,120
16	1,158	1,558	1,732	1,308	1,233	1,308	1,390	1,308	2,826	3,092	4,070	12,120
17	1,308	1,390	1,644	1,308	1,233	1,233	1,558	1,308	2,200	3,092	3,890	6,090
18	1,233	1,308	2,400	1,308	1,233	1,233	1,472	1,308	2,200	3,092	3,890	4,820
19	1,233	1,308	2,200	1,308	1,233	1,233	1,472	1,308	2,200	3,092	3,890	4,820
20	1,158	1,912	2,004	1,308	1,233	1,308	1,644	1,233	2,004	2,450	2,900	4,440
21	1,158	6,030	1,644	1,308	1,233	1,308	1,644	1,233	2,004	2,450	2,900	4,440
22	1,158	4,418	1,558	1,308	1,233	1,233	1,820	1,233	1,820	2,310	2,900	5,020
23	1,233	2,714	1,472	1,308	1,233	1,233	1,820	1,233	1,820	2,310	2,900	5,020
24	1,088	2,400	1,472	1,308	1,233	1,233	1,820	1,233	1,820	2,310	2,900	5,020
25	1,088	4,418	1,472	1,308	1,233	1,233	1,820	1,233	1,820	2,310	2,900	5,020
26	1,088	4,418	1,472	1,308	1,233	1,233	1,820	1,233	1,820	2,310	2,900	5,020
27	1,088	2,400	1,472	1,308	1,233	1,233	1,820	1,233	1,820	2,310	2,900	5,020
28	1,088	2,400	1,390	1,088	1,308	1,233	1,390	1,088	1,820	3,220	15,800	17,000
29	4,294	2,004	1,390	1,088	1,308	1,158	1,308	1,088	2,004	2,750	8,340	7,290
30	2,004	1,088	1,390	1,088	1,308	1,158	1,308	1,088	1,912	2,450	6,310	5,966
31	2,004	1,088	1,390	1,088	1,308	1,158	1,308	1,088	1,912	2,450	5,430	4,676
Maximum	4,294	6,030	4,666	1,472	1,390	2,004	7,394	1,820	10,122	6,090	29,760	17,000
Minimum	1,158	1,308	1,308	1,088	1,088	1,158	1,233	1,088	1,308	1,820	2,450	3,720
Mean...	1,456	2,298	1,821	1,273	1,302	1,325	1,806	1,283	2,421	2,619	7,676	6,273

*Note.*—Discharge determined from rating curves, applicable as follows: October 17, 1921, to December 27, 1922, fairly well-defined below 25,000 second-liters; December 28, 1921, to July 30, 1922, well-defined below 3,500 second-liters; July 31 to December 31, 1922, well-defined below 10,000 second-liters.

*Daily and monthly discharges, in liters per second, of Inarhan River near Santa Cruz, Calabanga, Camarines Sur,  
for the year 1922*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	3,902	2,535	1,894	1,512	1,347	1,274	1,203	3,210	1,020	2,280	1,350	4,860
2	3,902	2,432	1,894	1,512	1,347	1,274	1,203	2,160	1,020	2,160	1,460	4,090
3	3,902	2,696	1,894	1,512	1,426	1,347	1,347	1,570	1,020	2,660	5,350	3,490
4	3,442	2,535	1,787	1,512	1,426	1,274	1,274	1,460	1,020	1,920	3,070	3,350
5	3,442	2,386	1,787	1,512	1,347	1,274	1,680	1,240	1,020	1,920	2,790	3,210
6	3,050	3,236	1,787	1,426	1,347	1,274	1,274	1,920	1,020	1,680	2,160	3,070
7	5,450	2,535	1,690	1,512	1,274	1,274	1,070	1,460	1,020	1,800	2,040	3,070
8	3,442	2,250	1,690	1,426	1,274	1,274	1,070	1,680	1,020	1,680	1,920	2,930
9	3,050	2,126	2,126	1,426	1,347	1,347	1,008	1,460	1,570	2,930	1,920	2,930
10	4,160	2,006	1,690	1,512	1,347	1,274	1,347	1,240	1,130	2,400	1,800	2,660
11	3,050	2,006	1,690	1,426	1,347	1,274	1,008	1,570	1,020	2,400	2,040	2,400
12	9,578	2,006	1,598	1,426	1,347	1,347	1,203	1,240	1,130	1,920	1,920	2,660
13	4,418	2,006	1,598	1,512	1,347	1,274	1,135	1,460	1,020	1,920	1,460	2,930
14	3,236	2,006	1,598	1,426	1,347	1,274	1,070	1,460	1,240	1,680	2,660	2,530
15	3,442	2,006	1,598	1,426	1,426	1,274	1,070	1,460	1,460	1,920	2,400	2,530
16	3,050	2,006	1,690	1,426	1,347	1,203	1,008	1,460	1,460	1,800	2,040	3,350
17	2,864	2,006	1,690	1,426	1,347	1,203	1,070	1,240	1,240	1,680	1,920	5,860
18	2,690	2,006	1,690	1,512	1,347	1,274	1,070	1,570	1,920	1,680	1,800	4,090
19	2,690	1,894	1,690	1,598	1,347	1,274	1,070	1,240	1,240	1,800	1,680	7,540
20	3,236	1,894	1,598	1,426	1,347	1,347	2,386	1,130	1,020	1,920	3,210	4,700
21	2,690	1,894	1,598	1,426	1,274	1,347	1,690	1,020	10,120	1,680	2,160	6,760
22	2,535	1,894	1,598	1,426	1,690	1,274	2,535	1,020	2,530	1,570	1,920	4,090
23	2,386	1,894	1,598	1,347	1,347	1,274	2,006	1,130	2,660	1,980	1,920	3,350
24	2,386	1,894	1,598	1,426	1,274	1,274	1,203	1,020	2,160	1,370	1,570	6,220
25	2,386	1,894	1,598	1,426	1,347	1,274	1,135	1,020	2,430	1,680	1,570	7,540
26	3,050	1,787	2,250	1,347	1,426	1,274	3,442	1,020	2,430	1,240	15,390	7,540
27	2,864	1,787	1,598	1,311	1,690	1,274	3,442	1,020	2,430	1,240	23,800	4,240
28	2,535	1,598	1,598	1,347	1,347	1,274	1,070	1,020	2,400	1,800	22,350	4,240
29	2,386	1,598	1,598	1,347	1,347	1,274	1,070	1,020	2,280	1,240	12,870	19,450
30	2,386	1,598	1,598	1,347	1,347	1,274	1,070	1,020	2,280	1,240	12,870	19,450
31	2,386	1,598	1,598	1,347	1,347	1,274	1,070	1,020	2,280	1,240	12,870	19,450
Maximum	9,578	3,442	2,250	1,598	1,690	1,512	3,490	3,210	10,120	2,930	23,800	19,450
Minimum	2,386	1,787	1,512	1,347	1,274	1,203	1,008	1,020	1,020	1,240	1,350	2,400
Mean	3,366	2,169	1,708	1,442	1,376	1,304	1,164	1,373	2,167	1,842	4,344	4,698

NOTE.—See footnote to daily discharge for 1921.

## CAMARINES SUR PROVINCE

## LAGONUY RIVER, LAGONUY

LOCATION.—About 1 km. northeast of town of Lagonoy, and about 50 m. east of barrio trail from Lagonoy. This trail commences from the first street parallel to main street and runs in northwesterly direction from the town of Lagonoy.

RECORDS AVAILABLE.—From March 11, 1919, to July 15, 1922. Gage-height records only from February 1 to April 20, 1912.

GAGE.—Standard metric gage board fastened vertically in two sections to a large tree on left bank of the river.

DISCHARGE MEASUREMENT.—Made by wading at section of gage.

CHANNEL AND BANKS.—Channel is straight for 35 m. above and below station. Right bank high and left bank low. Both covered with vegetation. At measuring section stream bed composed of large gravel and boulders. Somewhat shifting.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 185,220 second-liters on November 25, 1921, estimated from extension of rating curve; minimum discharge, 2,420 second-liters scattered about in May and June, 1919.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharges from 1919 to October 16, 1920, determined from a poorly-defined curve; from October 17, 1920, to July 15, 1922, from well-defined rating curve. Gage read twice daily.

*Discharge measurements of Lagonoy River, near Lagonoy, Camarines Sur*

Day	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1919</b>				
April 9 . . . . .	A. Fegarido	.29	3,140	
April 10 . . . . .	do.	.32	3,450	
May 1 . . . . .	do.	.25	2,570	
May 2 . . . . .	do.	.25	2,520	
June 12 . . . . .	do.	.30	3,320	
June 13 . . . . .	do.	.28	3,230	
August 9 . . . . .	do.	.61	6,000	
August 11 . . . . .	do.	.43	4,920	
September 10 . . . . .	do.	.36	4,030	
September 11 . . . . .	A. Fegarido and M. B. Canas	.60	6,320	
November 12 . . . . .	A. Fegarido	.65	6,730	
November 12 . . . . .	do.	.70	7,290	
November 13 . . . . .	do.	.70	7,290	
November 21 . . . . .	do.	.72	7,780	
December 4 . . . . .	do.	1.08	13,010	
December 26 . . . . .	do.	.68	6,620	
<b>1920</b>				
January 22 . . . . .	M. B. Canas.	.68	6,670	
January 22 . . . . .	do.	.64	6,020	
February 11 . . . . .	do.	.48	5,100	
February 12 . . . . .	do.	.48	5,090	
March 12 . . . . .	do.	.49	4,600	
April 15 . . . . .	do.	.36	2,310	
May 11 . . . . .	do.	.36	1,570	
May 12 . . . . .	do.	.34	1,590	
June 12 . . . . .	do.	.30	1,260	
July 26 . . . . .	M. B. Canas and O. Buenaventura	.31	1,340	
August 9 . . . . .	O. Buenaventura	.29	2,414	
August 10 . . . . .	do.	.31	2,596	
August 19 . . . . .	do.	.33	2,847	

*Discharge measurements of Lagonoy River, near Lagonoy, Camarines  
Sur—Continued*

Date	Made by—	Gage height (meters)	Discharge (second- liters)	Remarks
<b>1920</b>				
August 26 . . .	O. Buenaventura	31	2,446	
September 8 . . .	do	30	2,458	
September 9 . . .	do	31	2,570	
September 20 . .	do	45	4,260	
September 21 . .	do	44	4,097	
October 9 . . .	do	49	5,067	
October 26 . . .	do	59	7,024	
November 9 . . .	do	61	7,460	
November 24 . .	do	57	6,545	
December 7 . . .	do	82	15,340	
December 8 . . .	do	82	15,589	
December 25 . .	do	65	7,804	
<b>1921</b>				
January 10 . . .	do	59	6,976	
January 28 . . .	do	54	5,402	
February 12 . . .	do	62	7,335	
February 25 . . .	do	92	14,202	
March 15 . . .	do	84	12,363	
March 28 . . .	do	68	8,955	
April 9 . . .	do	67	8,591	
April 25 . . .	do	66	8,227	
May 6 . . .	do	54	5,400	
June 21 . . .	do	42	4,021	
July 22 . . .	do	44	4,132	
August 17 . . .	do	42	4,001	
September 26 . .	do	58	6,413	
October 31 . . .	do	90	15,222	
November 19 . .	do	74	11,607	
December 13 . .	do	69	10,243	
December 26 . .	do	1 90	71,368	
<b>1922</b>				
January 7 . . .	O. Buenaventura and S. Musa.	1 10	33,745	
January 21 . . .	O. Buenaventura	70	10,783	
February 17 . . .	do	49	4,690	
March 9 . . .	do	44	4,895	
March 27 . . .	do	56	6,624	
April 7 . . .	do	43	4,931	
April 22 . . .	do	39	4,493	
May 9 . . .	do	36	3,832	
May 18 . . .	do	42	4,030	
May 27 . . .	do	34	3,290	
June 5 . . .	O. Buenaventura and W. Demers.	60	7,219	
June 26 . . .	O. Buenaventura	32	3,892	
July 12 . . .	do	36	4,314	

Daily and monthly discharges, in liters per second, of Lagonoy River near Lagonoy, Camarines Sur, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1				3,020	2,520	2,820	5,285	3,020	3,920	3,920	5,285	9,590
2				3,020	2,520	2,820	7,490	3,020	3,820	3,820	5,180	10,115
3				2,820	2,620	2,820	4,760	3,020	3,720	3,920	5,075	9,905
4				2,920	2,620	2,520	5,495	3,320	3,620	3,820	5,285	11,165
5				2,820	2,620	2,420	3,790	3,320	3,620	3,820	5,705	18,985
6				2,820	2,620	2,520	3,720	3,915	3,520	4,130	5,285	11,585
7				3,020	3,120	2,820	3,620	3,765	3,420	4,025	5,230	9,485
8				2,820	2,620	2,920	4,025	6,860	3,420	4,550	5,150	8,645
9				3,120	2,620	4,865	3,420	6,230	4,025	4,865	5,495	8,715
10				3,220	2,520	3,420	3,420	4,865	3,620	5,180	8,730	7,595
11			3,220	3,020	2,420	3,020	3,320	4,340	6,965	4,635	8,435	7,175
12			3,420	2,820	2,420	2,820	3,320	6,860	5,075	4,970	7,125	6,965
13			3,220	2,820	2,420	2,720	3,220	10,745	4,445	4,760	7,175	6,965
14			3,220	2,820	2,420	2,720	3,220	6,860	4,445	7,595	23,120	7,070
15			3,220	2,820	2,420	2,620	3,220	5,390	5,285	6,335	28,700	7,805
16			3,220	2,820	2,520	2,620	3,320	4,865	5,285	6,335	17,045	8,435
17			3,120	2,820	2,420	2,520	3,420	4,550	5,285	5,600	19,355	11,795
18			3,220	2,820	2,420	2,620	3,320	4,235	5,075	6,285	17,360	8,435
19			3,220	2,620	2,620	2,620	3,420	4,130	4,865	5,705	20,195	30,800
20			3,220	2,720	2,820	2,620	3,420	18,200	4,550	5,600	10,010	12,005
21			3,220	2,620	3,620	2,620	3,420	5,810	5,075	5,285	9,170	9,485
22			3,020	2,720	2,620	2,620	3,720	4,970	4,655	4,865	24,500	8,645
23			3,220	2,620	2,520	2,520	3,420	4,760	4,445	4,865	10,955	8,120
24			3,220	3,230	2,420	2,420	4,655	4,445	4,235	5,075	9,695	7,280
25			3,120	2,720	2,420	2,620	4,235	4,235	4,235	4,705	8,750	7,175
26			3,120	2,620	2,620	2,920	3,620	4,445	4,445	4,970	8,540	6,965
27			3,020	2,720	2,620	2,920	3,320	4,445	4,235	5,075	13,790	6,755
28			3,120	2,620	2,820	2,920	3,220	4,025	4,130	5,075	12,005	6,335
29			3,120	2,620	2,820	2,620	3,220	4,655	4,025	4,865	9,905	9,485
30			3,120	2,520	3,920	3,020	3,220	4,655	3,820	5,390	8,645	10,955
31			3,020		3,820		3,020	4,025		5,285		8,645
Maximum			3,420	3,220	3,920	4,865	7,490	18,200	6,965	8,225	29,120	30,800
Minimum			3,020	2,520	2,420	2,420	3,020	3,020	3,420	3,820	5,075	6,335
Mean			3,153	2,821	2,704	2,866	3,898	5,349	4,394	5,089	11,291	9,722



Daily and monthly discharges, in liters per second, of Lagonoy River near Lagonoy, Camarines Sur, for the year 1920

Day	Month												Maximum. Minimum. Mean.
	January	February	March	April	May	June	July	August	September	October	November	December	
1.	7,385	5,810	5,180	4,235	3,620	3,220	3,220	3,120	3,620	4,235	10,850	9,800	
2.	12,425	5,600	5,075	4,235	3,620	3,220	3,420	3,120	3,420	4,130	6,965	10,115	
3.	9,385	5,600	5,180	4,235	3,620	3,120	3,420	3,020	3,220	4,235	22,400	10,220	
4.	9,380	5,495	5,285	4,025	3,420	3,020	3,320	3,120	3,020	4,445	14,525	8,960	
5.	9,800	5,390	5,075	4,235	3,220	3,220	3,220	3,020	3,020	4,025	8,550	10,850	
6.	9,905	5,285	5,180	4,025	3,220	3,120	3,220	3,020	3,020	4,655	7,595	9,275	
7.	8,435	5,285	5,285	3,920	3,120	3,120	3,220	3,020	3,020	4,445	7,280	8,750	
8.	7,940	5,075	5,285	4,025	3,220	3,220	3,020	3,020	3,020	4,655	6,860	9,380	
9.	7,175	5,075	5,075	4,235	3,220	3,220	3,020	2,920	3,020	4,655	6,835	9,685	
10.	6,965	4,865	5,180	4,235	3,420	3,220	3,120	3,020	3,020	4,655	6,225	9,685	
11.	6,965	5,705	4,975	3,920	3,420	3,220	3,120	3,020	3,020	4,780	5,725	7,490	
12.	6,335	5,705	4,975	3,820	3,420	3,020	3,620	2,920	2,920	4,655	5,285	6,560	
13.	17,260	5,285	4,865	3,820	3,420	3,020	3,620	3,020	3,320	4,780	6,335	6,020	
14.	9,485	5,180	4,865	3,820	3,420	3,020	3,520	3,020	3,220	14,525	8,540	6,860	
15.	8,865	6,545	5,075	3,620	3,420	3,020	3,420	3,020	3,220	18,725	8,015	6,545	
16.	8,865	6,125	4,970	3,620	3,620	2,920	3,420	3,020	3,220	23,450	7,385	11,375	
17.	10,010	6,125	4,865	3,520	3,820	3,020	3,220	3,120	3,220	9,695	6,965	9,065	
18.	9,905	6,020	4,865	3,420	3,720	2,920	3,220	3,020	3,420	8,225	6,545	7,385	
19.	8,960	5,915	4,865	3,520	3,620	2,920	3,220	3,020	5,335	7,595	6,335	8,120	
20.	7,805	5,915	4,865	3,520	3,720	3,020	3,220	3,320	4,865	8,540	5,705	7,595	
21.	6,965	5,705	4,865	3,420	4,025	2,920	3,020	3,020	4,655	7,385	5,705	7,175	
22.	6,440	5,495	4,665	3,420	3,820	3,220	3,920	2,920	4,865	6,020	6,025	6,965	
23.	6,335	5,495	4,565	3,820	3,820	3,120	3,920	2,920	5,745	6,020	5,915	6,545	
24.	6,335	5,495	4,565	3,820	3,820	3,120	3,920	2,920	5,745	6,020	5,915	6,545	
25.	6,335	5,600	4,445	3,420	3,620	3,020	3,120	3,020	6,020	5,915	6,755	6,545	
26.	6,125	5,495	4,655	3,420	3,420	3,120	3,020	3,020	6,755	5,915	6,020	6,335	
27.	5,915	5,495	4,445	3,620	3,420	3,220	3,020	3,020	6,125	7,595	6,230	6,125	
28.	5,705	5,495	4,445	3,620	3,320	3,220	3,220	3,520	5,245	9,905	6,230	6,335	
29.	5,705	4,445	4,445	7,175	3,220	3,220	3,120	6,125	4,865	6,965	12,950	6,125	
30.	6,125	4,445	4,445	4,760	3,020	3,320	3,120	3,620	4,445	6,965	6,335	6,125	
31.	5,915	4,235	4,235	3,020	3,020	3,620	3,120	3,620	4,445	5,810	6,335	6,020	
Maximum.	17,260	6,545	5,285	7,175	4,025	3,320	3,920	6,125	6,755	23,450	22,400	11,375	
Minimum.	5,705	4,865	4,235	3,420	3,020	2,920	3,020	2,920	2,920	4,025	5,285	6,020	
Mean.	7,627	5,551	4,572	3,933	3,488	3,100	3,274	3,185	4,115	7,182	7,817	6,266	

Daily and monthly discharges, in liters per second, of Lagonoy River near Lagonoy, Camarines Sur, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	6,125	9,590	7,910	7,280	5,915	5,075	4,025	4,130	4,235	4,550	13,610	16,920
2.....	6,020	8,645	8,645	6,755	5,705	5,075	4,025	4,445	4,235	7,595	76,545	15,700
3.....	6,125	13,475	8,330	6,545	5,810	4,970	7,385	4,340	4,025	6,125	47,800	13,900
4.....	6,125	12,950	8,015	6,545	5,705	4,970	16,625	4,235	7,595	6,020	55,950	12,170
5.....	5,915	8,750	7,805	6,755	5,600	4,970	10,220	4,130	4,655	5,285	31,620	34,090
6.....	5,915	9,065	10,535	6,755	5,495	5,495	6,545	4,025	7,910	4,970	22,420	13,320
7.....	5,810	8,855	17,150	6,755	5,495	5,495	5,915	4,025	5,915	4,865	18,220	15,700
8.....	5,915	8,435	10,745	6,545	5,495	5,255	5,705	4,445	10,115	4,550	15,700	14,500
9.....	6,020	7,385	10,430	6,440	5,390	5,180	5,495	4,865	8,855	4,235	66,400	13,900
10.....	5,915	6,965	9,800	6,335	5,390	5,495	6,335	4,655	7,070	4,235	159,345	12,780
11.....	5,915	6,755	9,800	6,125	5,390	5,495	5,810	4,445	10,850	4,445	92,070	11,610
12.....	5,915	6,545	9,695	6,125	5,285	5,495	5,285	4,235	14,525	6,860	54,500	11,050
13.....	5,915	6,755	9,485	6,125	5,285	5,495	4,760	4,235	8,855	6,020	25,120	15,700
14.....	5,495	6,545	9,170	6,020	5,285	5,495	4,445	4,025	6,965	11,900	20,260	36,640
15.....	5,495	6,335	8,645	5,915	5,285	6,755	4,340	4,025	6,020	9,275	18,220	17,890
16.....	5,495	6,125	9,275	5,705	5,285	6,020	4,235	4,235	6,965	10,745	13,900	15,400
17.....	8,120	6,125	9,905	5,705	5,285	5,285	4,130	4,235	5,125	11,780	16,000	12,450
18.....	7,595	5,915	11,375	5,705	5,390	4,760	4,025	4,025	5,705	9,030	12,120	9,480
19.....	6,755	6,335	10,220	5,600	5,285	4,445	4,445	4,025	4,865	8,050	12,120	8,480
20.....	6,020	18,200	11,375	5,600	5,285	4,340	4,235	4,025	3,920	6,660	12,120	15,700
21.....	5,705	23,750	9,695	5,495	5,285	4,235	4,340	3,920	3,920	5,670	13,300	13,900
22.....	5,495	19,775	8,645	5,495	5,285	4,235	4,445	3,850	3,620	5,670	180,045	12,780
23.....	5,495	11,375	7,910	5,915	5,285	4,025	4,550	3,850	3,620	9,820	132,435	81,720
24.....	5,495	9,590	7,695	5,915	5,285	4,025	4,445	3,850	3,820	17,670	169,695	97,245
25.....	5,890	10,535	7,385	5,810	5,180	4,445	4,445	3,920	3,720	14,580	185,220	66,400
26.....	5,285	10,220	7,175	6,545	5,180	4,340	4,235	3,850	4,665	16,700	107,695	47,800
27.....	5,495	10,535	6,755	6,335	5,180	4,340	4,235	3,850	3,720	12,380	55,950	23,160
28.....	5,495	9,695	6,860	5,125	5,495	4,235	4,235	3,920	4,865	17,950	23,920	17,240
29.....	10,115	.....	6,755	5,915	5,390	4,695	4,235	4,025	4,970	27,330	20,260	15,400
30.....	7,595	.....	6,650	5,915	5,285	4,445	4,130	4,235	.....	24,680	20,260	15,400
31.....	7,385	.....	6,545	.....	5,285	4,445	4,130	4,235	.....	16,620	.....	14,500
Maximum	10,115	29,750	17,150	7,280	6,285	7,385	16,625	4,865	14,525	24,680	195,220	97,245
Minimum	5,285	5,915	6,545	5,495	5,180	4,025	4,025	3,850	3,620	4,935	12,120	8,480
Mean	6,200	10,081	9,051	6,160	5,394	5,098	5,339	4,151	6,012	9,003	56,885	23,460

NOTE.—Discharge determined from well-defined rating curves, applicable as follows: October 17, 1920, to November 2, 1921, good between 3,500 and 20,000 second-liters; November 2, 1921, to July 15, 1922, good between 2,500 to 16,000 second-liters.

Daily and monthly discharges, in liters per second, of Lagonoy River near Lagonoy, Camarines Sur, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	17,560	7,120	6,720	4,860	4,860	4,520	3,290	.....	.....	.....	.....	.....
2.....	17,560	12,730	5,920	4,520	4,360	3,880	4,040	.....	.....	.....	.....	.....
3.....	13,900	11,330	5,520	4,520	4,040	3,580	4,520	.....	.....	.....	.....	.....
4.....	13,300	8,240	5,375	4,520	3,880	3,580	3,780	.....	.....	.....	.....	.....
5.....	12,450	7,550	5,375	4,360	3,880	7,550	3,780	.....	.....	.....	.....	.....
6.....	11,330	7,550	5,200	4,320	3,780	5,735	4,580	.....	.....	.....	.....	.....
7.....	17,560	7,120	5,200	4,320	3,580	3,580	3,580	.....	.....	.....	.....	.....
8.....	17,560	7,120	5,030	4,520	3,580	3,580	3,290	.....	.....	.....	.....	.....
9.....	14,200	6,720	5,200	4,520	3,880	3,290	4,360	.....	.....	.....	.....	.....
10.....	12,170	6,720	5,200	4,520	3,580	3,290	3,880	.....	.....	.....	.....	.....
11.....	10,490	6,520	5,030	4,520	4,040	3,290	3,580	.....	.....	.....	.....	.....
12.....	27,140	6,320	5,920	5,200	3,880	3,000	3,580	.....	.....	.....	.....	.....
13.....	22,790	5,920	6,320	5,550	3,880	3,580	3,730	.....	.....	.....	.....	.....
14.....	15,700	5,920	5,920	4,690	3,880	3,145	3,580	.....	.....	.....	.....	.....
15.....	14,200	5,920	5,920	4,690	3,880	3,145	3,580	.....	.....	.....	.....	.....
16.....	13,300	5,735	5,920	4,200	3,580	3,145	.....	.....	.....	.....	.....	.....
17.....	11,890	5,735	5,550	4,200	5,375	3,000	.....	.....	.....	.....	.....	.....
18.....	10,770	5,550	5,550	4,940	4,360	3,000	.....	.....	.....	.....	.....	.....
19.....	9,950	5,550	5,550	4,940	4,360	3,000	.....	.....	.....	.....	.....	.....
20.....	9,440	5,375	5,375	4,200	4,200	3,580	.....	.....	.....	.....	.....	.....
21.....	9,440	5,375	5,375	4,200	3,880	3,290	.....	.....	.....	.....	.....	.....
22.....	8,960	5,200	5,550	4,200	5,520	3,145	.....	.....	.....	.....	.....	.....
23.....	8,960	5,200	5,030	4,040	5,550	3,230	.....	.....	.....	.....	.....	.....
24.....	8,480	5,030	4,860	3,880	4,690	3,145	.....	.....	.....	.....	.....	.....
25.....	8,480	5,200	5,375	5,375	3,880	3,000	.....	.....	.....	.....	.....	.....
26.....	8,000	5,550	8,960	4,520	3,580	3,000	.....	.....	.....	.....	.....	.....
27.....	8,480	5,200	8,480	4,200	3,290	3,580	.....	.....	.....	.....	.....	.....
28.....	8,720	5,375	6,720	3,880	3,290	3,290	.....	.....	.....	.....	.....	.....
29.....	8,000	.....	5,550	3,730	3,730	3,000	.....	.....	.....	.....	.....	.....
30.....	7,550	.....	5,200	4,520	3,580	3,290	.....	.....	.....	.....	.....	.....
31.....	.....	.....	4,860	.....	4,520	.....	.....	.....	.....	.....	.....	.....
Maximum	27,140	12,730	8,960	5,550	5,520	7,550	6,120	.....	.....	.....	.....	.....
Minimum	7,120	5,030	4,860	3,730	3,230	3,000	3,290	.....	.....	.....	.....	.....
Mean	12,455	6,559	5,753	4,459	4,092	3,596	3,917	.....	.....	.....	.....	.....

NOTE.—No record on March 9, 1922. See footnote to discharge table for 1921.

## CAMARINES SUR PROVINCE

## LIBMANAN RIVER, SIPOCOT

LOCATION.—Just opposite Municipal Building of Sipocot.

RECORDS AVAILABLE.—From January 12, 1921, to June 18, 1922. Also from January 11, to April 20, 1912, inclusive.

GAGE.—Standard metric gage board horizontally fastened to a tree on the right bank of the river. Chain was used to measure the height.

DISCHARGE MEASUREMENTS.—Made by wading at section of gage.

CHANNEL AND BANKS.—Channel only one at all stages; straight for 300 m. above and below the station. Both banks high, not subject to overflow, rocky and wooded. Stream bed shifting, composed of gravel and rock. Flow swift.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 936,100 second-liters, on November 26, 1921; minimum, 3,362 second-liters, on March 8, 1922.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharged determined from poorly defined rating curves. Gage read twice daily.

*Discharge measurements of Libmanan River, near Poblacion, Sipocot, Camarines Sur*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1912</b>				
January 10 .	W. Demers	.78	11,100	
March 28	do	.70	7,150	
<b>1921</b>				
February 19	S. Musa	.78	25,360	
April 3	do.	.25	23,660	
May 13	do	.15	6,051	
June 28	do.	.18	5,852	
August 2	do	.12	7,416	
October 3	do	.31	12,751	
October 3	do	.31	14,712	
November 16	do.	.75	42,130	
December 17 .	do	1.48	86,645	
<b>1922</b>				
February 15	do	.30	16,783	
March 13	O. Buenaventura and S. Musa	.97	19,416	
April 11. . .	O. Buenaventura . . .	1.01	18,999	
April 12	do	.98	18,038	
May 3.	do	.80	14,729	

*Daily and monthly discharges, in liters per second, of Libmanan River near Poblacion, Sipocot, Camarines Sur,  
for the year 1912*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....		7,570	9,960	6,780								
2.....		7,570	9,960	9,960								
3.....		7,980	13,120	7,160								
4.....		8,400	9,960	7,160								
5.....		7,570	9,440	6,780								
6.....		24,320	13,120	7,160								
7.....		12,460	9,440	6,780								
8.....		7,980	8,920	6,400								
9.....		7,980	7,160	7,160								
10.....		7,160	7,980	6,030								
11.....	12,460	7,160	7,160	9,440								
12.....	12,460	6,780	7,160	12,460								
13.....	26,420	7,160	7,160	9,440								
14.....	16,520	7,160	7,160	8,400								
15.....	13,120	7,160	7,160	8,400								
16.....	11,140	7,570	7,160	8,400								
17.....	9,960	8,920	6,780	7,980								
18.....	9,440	9,440	6,780	7,980								
19.....	9,440	9,440	6,780	7,980								
20.....	9,960	22,220	19,420	7,980								
21.....	9,960	116,720	12,460	7,980								
22.....	8,920	27,320	7,570									
23.....	7,980	23,320	7,980									
24.....	8,400	19,420	7,760									
25.....	8,920	14,520	6,780									
26.....	8,920	13,120	7,760									
27.....	7,570	11,800	7,760									
28.....	7,160	11,140	7,760									
29.....	7,160	.....	6,400									
30.....	7,160	.....	6,400									
31.....	7,980	.....	6,400									
Maximum.....	26,420	116,720	19,420	12,460								
Minimum.....	7,160	6,780	6,400	6,400								
Mean.....	10,590	18,486	8,762	7,930								

NOTE.—No record on days for which discharge is not given.

*Daily and monthly discharges, in liters per second, of Libmanan River near Poblacion, Sipocot, Camarines Sur, for the year 1921*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1		261,100	55,600	21,460			9,210	9,210	30,840	44,390	60,325	90,350
2		120,100	33,240	12,210			12,210	10,110	22,030	22,030	77,850	90,825
3		65,725	24,160	12,210			13,650	9,210	13,660	22,030	279,850	41,825
4		68,700	49,000	11,110			17,110	10,210	19,210	24,910	159,850	172,840
5		90,350	45,700	10,210			55,950	10,210	18,400	24,910	222,850	318,800
6		185,100	39,350	27,280			13,760	5,870	18,400	24,910	80,400	105,500
7		165,725	291,350	27,280			13,760	5,870	32,640	10,210	113,100	69,900
8		124,600	59,700	12,210			10,710	3,540	32,640	10,210	74,800	56,950
9		128,100	59,700	12,210			10,710	3,540	32,640	10,210	74,800	56,950
10		23,440	65,725	5,870			7,280	17,550	14,280	4,930	154,800	50,980
11		33,240	65,725	5,870			7,280	12,210	46,360	22,030	311,350	45,040
12	29,040	33,240	41,700	6,340			7,280	8,240	398,350	33,200	138,100	36,870
13	20,890	142,600	42,470	5,400			9,210	12,210	223,175	26,660	85,300	38,730
14	18,100	45,000	27,600	5,400			10,210	13,240	307,600	25,490	58,975	262,600
15	15,350	33,240	108,850	4,460			7,760	8,240	145,600	70,600	45,700	201,850
16	*150,100	21,460	86,725	4,460			5,870	19,770	83,200	26,660	42,470	77,600
17	39,350	15,900	127,850	3,540			3,540	15,900	45,040	18,100	34,440	98,300
18	31,440	17,550	202,600	4,930			23,170	8,240	22,030	14,710	26,660	76,200
19	37,490	36,260	258,850	3,540			18,650	9,210	26,660	14,280	42,470	169,600
20	35,940	187,600	217,100	3,540			8,240	8,240	13,760	13,760	34,440	123,100
21	25,490	221,350	183,850	3,540			13,760	5,870	24,910	53,620	724,600	69,200
22	24,330	240,100	169,200	3,540			12,210	5,870	35,650	253,600	.....	96,850
23	29,040	183,850	37,490	3,540			13,240	10,710	57,625	150,100	.....	74,100
24	23,170	83,200	30,240	.....			13,240	8,240	23,170	96,850	334,600	408,850
25	17,550	303,850	25,490	.....			10,710	8,240	39,970	360,100	936,100	340,850
26	23,170	286,350	19,770	.....			9,210	5,870	67,100	281,100	182,350	145,600
27	24,330	146,350	21,460	.....			9,210	5,870	47,780	90,350	114,850	98,350
28	24,330	86,725	23,170	.....			9,210	5,870	39,350	48,340	78,400	73,400
29	47,780	.....	27,250	.....			7,280	30,240	147,750	35,040	80,400	56,950
30	94,050	.....	39,350	.....			8,240	25,490	.....	.....	.....	58,300
31	138,850	27,250	27,250	.....			171,100	30,240	398,350	360,100	936,100	408,850
Maximum	150,100	303,850	281,350	27,250	.....	.....	171,100	30,240	398,350	360,100	936,100	408,850
Minimum	15,350	15,900	19,770	3,540	.....	.....	3,540	3,540	10,210	4,930	26,660	36,870
Mean	42,442	114,523	92,933	9,049	.....	.....	17,681	10,444	67,088	60,930	182,753	117,978

Note.—No record on days for which discharge is not given. \* Unreliable.

*Daily and monthly discharges, in liters per second, of Libmanan River near Poblacion, Sipocot, Camarines Sur, for the year 1922*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	47,020	16,450	19,225	15,325	16,325	13,125						
2	30,840	67,100	18,525	17,725	15,325	13,325						
3	30,840	62,350	5,300	17,738	15,125	13,125						
4	47,020	41,840	4,488	17,525	14,325	18,925						
5	51,640	73,400	3,738	17,125	14,125	16,325						
6	35,650	92,550	3,550	14,725	13,925	14,925						
7	36,260	41,210	3,925	17,325	13,925	14,125						
8	29,640	27,840	3,362	16,725	14,725	13,325						
9	30,840	23,170	3,550	15,125	15,725	13,525						
10	43,110	20,890	16,325	15,325	14,525	13,525						
11	37,490	18,100	7,675	16,725	14,525	13,525						
12	145,300	16,150	15,325	13,125	13,125	12,325						
13	110,600	14,100	16,325	16,725	11,425	12,725						
14	110,600	14,280	6,550	25,950	11,725	12,725						
15	117,850	13,240	21,350	25,700	13,125	13,525						
16	86,000	11,710	21,350	19,862	13,725	12,325						
17	43,750	11,210	25,250	15,925	13,725	13,125						
18	36,260	10,210	18,300	15,525	13,125	12,325						
19	29,640	10,210	21,988	15,325	11,925	12,325						
20	36,260	50,320	15,325	15,325	11,925	12,325						
21	30,840	13,240	19,225	15,325	13,525	13,525						
22	27,250	12,520	20,712	16,325	14,525	13,525						
23	25,490	11,210	16,325	14,525	13,525	13,525						
24	22,030	11,210	17,325	14,525	13,525	13,525						
25	22,030	9,210	16,325	14,525	13,525	13,525						
26	20,890	9,210	35,150	14,325	12,125	12,125						
27	44,390	9,210	23,900	14,325	13,725	13,725						
28	48,340	8,240	21,988	14,325	13,525	13,525						
29	24,910	.....	18,588	14,162	12,525	12,525						
30	20,890	.....	17,325	15,325	11,325	11,325						
31	17,000	.....	16,325	16,325	12,325	12,325						
Maximum	153,100	92,550	35,150	27,950	19,650	16,325						
Minimum	13,240	8,240	3,362	13,325	11,325	10,325						
Mean	47,092	25,803	14,960	16,878	13,860	13,402						

## CAMARINES SUR PROVINCE

## PAWILI RIVER, PILI

LOCATION.—About 18.5 km. from Naga. Right below the upstream side of steel bridge on the Naga-Iriga Road.

RECORDS AVAILABLE.—From March 7, 1919, to December 31, 1922. Also from March 20, 1910, to April 20, 1912, inclusive at exactly the same location as the present station.

GAGE.—Consists of two sections; the lower section is standard metric gage board, 1 m. long, fastened vertically on the right and at the lower part of abutment of bridge; the other section is an inclined staff fastened on upstream end of same abutment and reads from 1 m. to 3.87 m.

DISCHARGE MEASUREMENTS.—Made by wading at low water; from bridge at high water at section of gage.

CHANNEL AND BANKS.—Channel is straight for over 50 m. above gaging section. Channel below is also straight except that there is a large piece of debris of old bridge. Banks high, not subject to overflow and covered with "Santa Elena" trees. Measuring section will give good results at low water stage. Stream bed of solid hard adobe stone and rather rough. Flow fairly uniform.

EXTREMES OF DISCHARGE.—Maximum discharge during period of observation, 318,480 second-liters on November 22, 1910; minimum discharge, 640 second-liters on March 25 and 26 and April 1, 1912.

DIVERSION.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge from March 20, 1910, to April 20, 1912, determined from fairly well-defined curve and holds good between 4,000 to 44,000 second-liters. Discharges from March 7, 1922, to December 31, 1922, are determined from a well-defined curve and holds good between 1,800 to 5,800 second-liters. Gage read twice daily.

*Discharge measurements of Pawili River, near Santo Domingo, Pili,  
Camarines Sur*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1910</b>				
March 29	J. I. Quinn	1.05	11,210	
April 7	do	.60	2,390	
May 12	do	.61	4,024	
June 28	do	.64	3,600	
July 10	do	.74	6,393	
July 18	do	.74	6,390	
August 17	do	.62	2,480	
August 17	do	.62	2,550	
September 2	do	.76	7,774	
September 6	do	.77	7,312	
October 21	H. V. Hall	.72	5,542	
October 21	do	.72	5,880	
November 17	J. I. Quinn	.91	9,900	
November 30	W. Demers	.85	7,070	
December 5	do	1.65	53,550	
<b>1911</b>				
January 4	do	.83	8,100	
January 5	do	.94	8,887	
January 14	do	.77	6,457	
January 25	do	.71	4,160	
February 6	do	.60	1,860	

NOTE.—Gage heights from April 12, 1919, referred to a datum of different elevation.



*Discharge measurements of Pawili River, near Santo Domingo, Pili,  
Camarines Sur—Continued*

Date	Made by—	Gage height (meters)	Discharge (second- liters)	Remarks
<b>1911</b>				
February 14..	W. Demers..	.87	9,080	
February 17..	do	1 08	15,600	
March 2..	do	.93	9,072	
March 7..	do.	.69	5,575	
March 18..	do	.68	4,435	
March 22..	do	.67	3,697	
March 24..	do	.67	3,364	
March 27..	I. S. Lawrence	.78	5,433	
April 5..	do	.70	3,950	
April 20..	do.	.70	4,640	
April 27..	do	.71	3,700	
May 10..	do.	.75	5,460	
May 24..	do.	.59	3,840	
June 7..	do.	.58	4,420	
June 7..	do.	.61	2,610	
July 7..	do.	.85	5,870	
July 21..	do	1 32	9,850	
August 4..	do	.80	8,050	
August 16..	do	.74	4,300	
August 30..	do	.80	7,690	
September 15..	do	.64	7,120	
September 18..	do	.88	8,090	
September 27..	do	.77	4,670	
October 12..	do	.70	4,010	
October 16..	do	.71	4,060	
December 12..	do	.64	3,770	
December 22..	do	.62	2,900	
<b>1912</b>				
January 9..	do.	.59	2,550	
January 11..	do	.58	2,020	
January 24..	do	.55	2,320	
February 10..	do	.52	2,360	
February 16..	do	.55	2,620	
February 23..	do	.60	2,800	
March 2..	do.	.52	2,280	
March 6..	do	.48	1,950	
March 8..	do	.53	2,300	
March 18..	do	.55	2,670	
March 30..	W. Demers	.50	2,200	
April 4..	do	.53	2,040	
<b>1919</b>				
April 12..	A. Fegarido	.40	2,330	
April 28..	do	.38	2,120	
May 6..	do	.37	2,010	
May 29..	do	.39	3,060	
June 10..	do	.60	5,790	
June 18..	do	.35	1,830	
September 8..	A. Fegarido and M. Canas	.46	2,456	
September 13..	do	.80	8,190	
October 10..	do	.82	6,530	
October 18..	do	.71	6,950	
November 11..	do	.72	7,180	
November 14..	do.	.75	7,860	
November 19..	do	.80	7,240	
December 3..	do.	.73	8,110	
December 8..	do.	.76	8,840	
<b>1920</b>				
January 20..	M. Canas..	.57	5,220	
February 10..	do.	.55	4,720	
February 13..	do	.59	5,770	
March 10..	do.	.41	2,540	
March 13..	do.	.42	2,960	
April 14..	do.	.41	2,460	
April 19..	do.	.38	1,940	
May 10..	do	.41	2,680	
May 14..	do	.41	2,560	
June 10..	do.	.42	3,200	
June 15..	do.	.41	3,280	
July 5..	do.	.80	6,030	
July 27..	M. Canas and O. Buena- ventura.	.68	5,480	
July 27..	do.	.60	4,630	

*Discharge measurements of Pawili River, near Santo Domingo, Pili,  
Camarines Sur—Continued*

Date	Made by—	Gage height (meters)	Discharge (second- liters)	Remarks
<b>1920</b>				
August 5	O. Buenaventura	.40	2,481	
August 11	do.	.40	2,110	
August 18	do	.38	1,915	
August 20	do	.73	8,101	
September 6	do	.58	6,106	
September 10	do.	.45	3,021	
September 18	do.	.43	2,730	
September 23	do	.75	11,069	
October 8	do	.61	6,398	
October 14	do	1.50	27,858	
October 23	do	.62	6,626	
October 27	do	.56	5,456	
November 6	do	.78	11,814	
November 10	do	.56	5,432	
November 22	do	.50	4,159	
December 4	do.	.68	8,442	
December 10	do	.67	7,702	
December 23	do	.54	4,658	
<b>1921</b>				
January 8	do	.46	3,012	
January 12	do	.44	2,739	
January 25	do	.42	2,213	
January 29	do	.45	2,541	
February 9	do.	.74	10,333	
February 14	do	.48	3,588	
February 22	do	.81	12,309	
February 26	do	.68	8,348	
March 12	do	.63	6,424	
March 16	do	.68	8,330	
March 25	do	.48	2,862	
March 29	do.	.46	2,426	
April 7	do	.45	2,541	
April 23	do	.40	1,920	
April 28	do.	.39	1,772	
May 5	do	.39	1,871	
May 8	do	.38	1,539	
June 15	do.	.42	2,213	
June 27	do	.41	1,888	
July 14	do	.45	2,593	
July 23	do	1.22	25,654	
August 9	do	1.39	32,245	
September 7	do	.78	11,416	
September 15	do	.89	15,052	
September 23	do	.82	13,408	
October 7	do	.56	5,004	
October 10	do	.60	6,205	
November 8	do	.72	9,704	
November 26	S. Musa	3.70	110,876	
December 7	do	1.12	22,805	
December 20	O. Buenaventura	.73	9,863	
December 28	do	.84	13,316	
<b>1922</b>				
January 5	do	.62	6,598	
January 9	do.	.58	5,683	
January 18	do	.62	6,790	
January 23	do.	.56	5,263	
February 4	do	.53	4,748	
February 14	do.	.44	3,172	
February 25	do	.44	2,914	
February 27	do	.46	3,124	
March 8	do	.44	2,855	
March 25	do	.43	2,587	
April 6	do	.42	2,525	
April 15	do	.43	2,244	
April 25	do.	.42	2,220	
May 5	do.	.45	2,410	
May 10	do.	.42	2,171	
May 17	do.	.42	2,236	
May 25	do.	.43	3,072	
June 24	do.	.38	2,131	
July 11	do.	.63	5,984	
August 7	do.	1.15	23,141	
August 22	do.	.56	3,968	
August 29	do.	.41	2,155	

*Discharge measurements of Pawili River, near Santo Domingo, Pili,  
Camarines Sur—Continued*

Date	Made by—	Gage height (meters)	Discharge (second- liters)	Remarks
<b>1922</b>				
September 2 . . . . .	O. Buenaventura	.52	3,553	
September 21 . . . . .	do.	.74	10,267	
October 8 . . . . .	do.	.56	4,175	
October 12 . . . . .	do.	.71	9,514	
October 19 . . . . .	do.	.53	3,865	
October 26 . . . . .	do.	.44	2,873	
October 30 . . . . .	do.	.58	4,367	
November 3 . . . . .	do.	.47	3,626	
November 16 . . . . .	do.	.72	9,377	
December 2 . . . . .	do.	.80	12,447	
December 7 . . . . .	do.	.73	9,926	
December 14 . . . . .	do.	.53	4,148	

Daily and monthly discharges in liters per second, of Pavili River near Santo Domingo, Pili, Camarines Sur, for the year 1910

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.	..	..	..	1,240	1,600	6,120	3,880	2,720	14,440	22,560	43,380	8,280
2.	..	..	..	1,760	1,920	5,180	4,660	2,520	7,320	16,000	42,400	7,620
3.	..	..	..	2,720	1,240	3,880	4,920	1,760	6,420	62,000	30,720	43,870
4.	..	..	..	1,600	1,760	4,400	3,860	3,880	9,280	43,260	13,660	51,880
5.	..	..	..	2,720	1,600	3,960	4,010	3,880	4,320	28,460	10,160	18,710
6.	..	..	..	1,240	1,760	3,360	4,400	3,880	4,320	28,460	6,420	14,440
7.	..	..	..	2,120	3,360	3,120	2,820	2,360	9,620	18,580	4,920	10,000
8.	..	..	..	1,440	2,920	2,820	2,820	2,360	16,320	10,720	4,920	9,620
9.	..	..	..	1,880	2,390	2,820	2,390	2,360	16,320	38,480	5,120	15,600
10.	..	..	..	1,600	2,390	2,820	2,390	2,360	16,320	38,480	5,120	12,160
11.	..	..	..	1,240	3,360	3,120	2,820	2,360	16,320	38,480	5,120	8,600
12.	..	..	..	1,880	2,390	2,820	2,390	2,360	16,320	38,480	5,120	7,960
13.	..	..	..	1,000	2,920	2,120	15,160	4,660	7,320	24,240	166,600	7,620
14.	..	..	..	1,240	2,920	2,000	15,600	2,720	6,200	17,600	37,500	10,720
15.	..	..	..	1,600	1,840	3,580	15,200	2,920	8,500	16,800	18,000	8,920
16.	..	..	..	1,120	1,920	2,760	38,480	2,920	13,880	14,440	13,880	8,920
17.	..	..	..	1,120	1,600	2,300	19,300	2,720	16,000	12,920	10,000	39,460
18.	..	..	..	1,000	1,840	2,120	6,120	2,720	8,920	11,440	9,280	..
19.	..	..	..	1,120	2,390	1,840	2,920	3,120	111,000	7,960	10,000	..
20.	..	..	..	1,000	2,520	2,300	3,880	1,440	15,200	7,960	10,720	..
21.	..	..	..	1,000	2,210	1,600	3,360	4,920	20,040	6,720	14,440	..
22.	..	..	..	1,000	2,520	1,840	1,760	5,820	26,000	5,520	318,480	..
23.	..	..	..	2,300	3,120	2,920	2,920	5,520	64,940	4,400	31,680	..
24.	..	..	..	3,120	6,720	2,300	1,440	3,880	16,800	3,360	19,200	..
25.	..	..	..	2,920	5,180	3,120	2,120	3,360	10,720	3,880	16,800	..
26.	..	..	..	3,120	4,400	2,920	1,760	4,660	8,280	2,920	13,880	..
27.	..	..	..	1,760	4,920	3,880	1,240	7,020	9,280	2,920	11,800	..
28.	..	..	..	2,720	2,300	4,400	1,440	3,880	75,720	4,400	9,280	..
29.	..	..	..	3,360	20,880	5,180	1,440	2,920	32,160	7,020	10,000	..
30.	..	..	..	1,920	7,620	2,120	1,760	27,840	62,000	7,020	10,000	..
31.	..	..	..	1,920	7,620	2,120	2,520	30,720	111,000	12,160	10,000	..
Maximum.	..	..	12,520	3,580	20,880	6,120	38,480	30,720	111,000	62,000	318,480	67,880
Minimum.	..	..	1,760	880	1,000	1,600	1,240	1,440	4,240	1,440	4,240	7,620
Mean.	..	..	4,246	1,681	3,547	3,156	5,665	5,429	22,055	16,481	30,475	20,192

NOTE.—Daily discharge determined from a fairly well-defined rating curve between 2,000 to 44,000 second-liters. Applicable from March 20, to December 31, 1920. No records of gage heights on dates for which discharges are not given.

Daily and monthly discharges in liters per second, of Pawli River near Santo Domingo, Pili, Camarines Sur, for the year 1911

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	14,440	6,920	14,440	3,580	3,880	2,720	300,140	15,600	5,520	4,660	2,520	4,400
2	12,920	6,920	12,920	2,920	3,880	2,520	143,340	10,720	4,140	4,660	2,300	2,520
3	10,000	2,520	10,720	3,360	6,720	2,120	25,540	9,620	3,880	4,400	1,760	3,920
4	8,600	2,300	9,280	4,920	8,920	2,120	15,200	7,960	4,140	3,880	2,520	2,860
5	12,920	2,120	8,600	3,880	7,620	2,300	11,440	6,320	4,140	2,520	2,520	2,720
6	9,280	2,920	7,320	2,820	7,020	2,520	10,360	6,420	3,580	8,600	2,300	2,520
7	8,600	7,020	6,420	3,880	7,020	1,920	7,320	6,420	5,820	5,180	17,200	2,320
8	8,286	4,400	7,020	3,360	7,020	1,920	12,160	11,440	6,420	4,400	14,960	4,920
9	12,160	3,360	4,920	13,360	6,720	2,120	16,720	7,320	4,140	4,400	3,880	4,920
10	13,360	3,360	6,120	16,800	6,720	2,720	12,300	16,720	3,360	3,880	5,420	3,360
11	7,320	28,300	6,420	6,420	9,420	2,120	17,300	17,300	3,360	3,360	4,400	3,360
12	7,320	23,680	5,820	4,920	3,880	2,120	23,820	17,020	3,580	3,880	3,880	6,720
13	6,720	10,720	4,920	4,920	3,580	3,120	226,640	6,420	4,400	4,400	3,360	6,120
14	6,720	23,820	4,920	4,400	2,520	3,360	313,660	6,120	3,880	5,180	2,920	3,580
15	7,320	21,500	4,400	4,400	2,720	3,120	122,760	6,420	4,140	4,400	3,120	3,360
16	7,320	19,200	4,400	4,140	2,720	2,520	67,920	4,660	7,620	3,880	3,120	7,320
17	4,920	47,300	4,400	3,880	2,920	6,420	42,890	11,440	4,400	3,360	3,360	4,660
18	4,400	51,220	5,180	4,660	2,920	6,420	47,790	30,720	9,620	4,920	2,920	3,880
19	4,400	37,940	4,920	5,820	2,520	6,420	37,990	19,600	13,680	3,880	2,720	3,580
20	4,140	29,760	4,400	3,580	4,660	3,360	26,920	12,920	14,060	3,880	2,520	3,580
21	3,580	16,000	3,880	2,980	2,520	3,360	21,720	27,840	25,120	3,360	2,520	2,120
22	4,400	12,920	4,140	9,280	2,520	2,520	13,200	26,440	19,020	3,360	2,520	2,120
23	3,880	27,600	4,820	4,140	2,520	1,760	13,300	13,000	19,620	2,720	2,300	2,520
24	3,880	27,840	4,820	4,140	3,360	1,920	8,920	19,600	7,020	2,720	2,300	2,720
25	3,360	20,040	5,320	4,400	3,360	1,600	9,280	11,440	6,720	2,520	2,300	2,520
26	3,360	20,040	5,320	4,400	3,120	1,600	19,200	12,160	6,120	1,760	2,120	2,120
27	3,360	20,040	3,880	3,880	2,520	2,520	19,600	9,280	6,720	2,520	2,120	2,120
28	3,360	20,040	3,880	3,360	2,920	6,120	15,600	7,960	4,660	2,520	2,300	2,300
29	3,360	51,220	3,360	2,980	2,720	8,280	313,660	30,720	25,120	8,600	17,200	7,320
30	2,920	2,120	2,520	2,920	2,520	1,600	6,720	4,660	3,360	1,760	1,760	2,120
31	7,135	17,909	6,036	5,863	4,356	2,969	53,971	12,283	7,087	3,821	3,878	3,643
Maximum	14,440	51,220	14,440	22,980	8,920	8,280	313,660	30,720	25,120	8,600	17,200	7,320
Minimum	2,920	2,120	2,520	2,920	2,520	1,600	6,720	4,660	3,360	1,760	1,760	2,120
Mean	7,135	17,909	6,036	5,863	4,356	2,969	53,971	12,283	7,087	3,821	3,878	3,643

NOTE.—Daily discharge determined from a fairly well-defined rating curve, and holds good between 4,000 and 44,000 second-liters. Applicable throughout the year.

Daily and monthly discharges in liters per second, of Pawili River near Santo Domingo, Pili, Camarines Sur, for the year 1912

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	1,760	1,120	1,600	640	..	..	..	..	..	..	..	..
2	1,920	1,120	1,120	1,120	..	..	..	..	..	..	..	..
3	2,120	1,920	1,440	1,240	..	..	..	..	..	..	..	..
4	2,120	1,600	1,760	1,000	..	..	..	..	..	..	..	..
5	2,520	1,760	1,000	1,240	..	..	..	..	..	..	..	..
6	2,520	1,600	1,000	1,000	..	..	..	..	..	..	..	..
7	2,920	1,600	1,000	1,240	..	..	..	..	..	..	..	..
8	2,520	1,440	1,240	1,120	..	..	..	..	..	..	..	..
9	1,920	1,240	1,120	1,000	..	..	..	..	..	..	..	..
10	2,120	1,760	1,600	1,120	..	..	..	..	..	..	..	..
11	2,520	1,600	1,880	1,000	..	..	..	..	..	..	..	..
12	2,720	1,760	1,440	1,440	..	..	..	..	..	..	..	..
13	2,920	1,440	1,120	1,440	..	..	..	..	..	..	..	..
14	2,520	1,240	1,120	1,440	..	..	..	..	..	..	..	..
15	2,900	1,440	1,240	1,440	..	..	..	..	..	..	..	..
16	2,120	1,920	1,440	1,240	..	..	..	..	..	..	..	..
17	1,760	1,440	1,240	1,000	..	..	..	..	..	..	..	..
18	1,760	1,240	1,240	1,120	..	..	..	..	..	..	..	..
19	1,600	1,440	1,600	1,120	..	..	..	..	..	..	..	..
20	1,240	7,320	1,240	1,120	..	..	..	..	..	..	..	..
21	1,440	6,720	880	..	..	..	..	..	..	..	..	..
22	1,600	2,720	1,000	..	..	..	..	..	..	..	..	..
23	1,440	1,920	1,000	..	..	..	..	..	..	..	..	..
24	1,440	1,440	1,600	..	..	..	..	..	..	..	..	..
25	1,000	2,120	640	..	..	..	..	..	..	..	..	..
26	1,120	1,920	720	..	..	..	..	..	..	..	..	..
27	1,120	1,440	1,120	..	..	..	..	..	..	..	..	..
28	1,120	1,440	1,120	..	..	..	..	..	..	..	..	..
29	1,440	1,600	1,120	..	..	..	..	..	..	..	..	..
30	1,120	..	1,600	..	..	..	..	..	..	..	..	..
31	1,120	..	1,000	..	..	..	..	..	..	..	..	..
Maximum	3,580	7,320	1,760	1,440	..	..	..	..	..	..	..	..
Minimum	1,000	1,120	640	640	..	..	..	..	..	..	..	..
Mean	1,926	1,999	1,327	1,154	..	..	..	..	..	..	..	..

NOTE.—Daily discharges determined from a fairly well-defined curve, and holds good between 4,000 and 44,000 second-liters. Applicable from January 1 to April 20, 1912.

Daily and monthly discharges in liters per second, of Pawili River near Santo Domingo, Pili, Canarines Sur, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....				2,220	2,120	2,220	15,860	5,075	5,780	2,690	4,270	14,080
2.....				2,440	2,120	2,220	15,860	5,075	5,780	2,690	4,270	11,560
3.....				2,440	2,120	2,220	15,860	5,075	5,780	2,690	4,270	11,560
4.....				2,220	2,120	2,220	20,960	8,060	5,780	2,690	3,575	19,760
5.....				2,330	2,120	1,930	40,160	35,960	4,660	2,690	3,575	32,660
6.....				2,330	2,020	1,930	10,760	15,260	4,090	2,960	3,105	59,360
7.....				2,220	2,020	1,930	4,865	22,160	3,740	3,910	3,105	21,260
8.....			2,440	2,330	2,020	2,020	4,660	52,760	3,410	3,910	3,740	12,860
9.....			2,330	2,120	1,930	2,120	3,410	31,760	3,105	4,865	5,300	11,660
10.....			2,330	2,330	2,020	3,410	2,560	36,260	3,105	14,360	4,660	8,660
11.....			2,330	2,220	2,020	5,780	3,105	22,760	23,060	20,060	9,360	7,460
12.....			2,330	2,440	2,020	4,660	2,560	15,560	23,060	20,060	12,560	6,060
13.....			2,330	2,220	2,220	2,220	2,560	15,560	15,860	18,060	12,560	6,060
14.....			2,560	2,440	2,440	2,020	2,560	15,560	15,860	18,060	12,560	6,060
15.....			2,560	2,440	2,440	2,020	2,560	15,560	15,860	18,060	12,560	6,060
16.....			2,560	2,440	2,440	2,020	2,560	15,560	15,860	18,060	12,560	6,060
17.....			2,560	2,440	2,440	2,020	2,560	15,560	15,860	18,060	12,560	6,060
18.....			2,330	2,120	2,120	2,120	3,410	19,160	22,460	9,260	4,270	5,780
19.....			2,330	2,120	2,120	2,120	3,410	19,160	22,460	9,260	4,270	5,780
20.....			2,440	2,020	2,220	2,020	4,460	7,460	28,460	11,660	31,460	5,075
21.....			2,330	2,330	2,220	1,840	4,460	6,300	15,260	4,270	61,460	6,860
22.....			2,330	2,330	2,220	2,560	3,575	5,780	13,460	13,160	23,360	27,260
23.....			2,330	2,120	2,220	2,330	3,575	15,860	8,960	8,960	18,860	14,360
24.....			2,330	2,120	2,220	2,120	17,760	10,760	4,560	6,860	36,860	.....
25.....			2,440	2,020	2,120	1,930	13,560	21,760	5,530	5,530	59,860	.....
26.....			2,440	2,020	2,120	1,930	17,460	11,560	3,740	4,275	11,560	.....
27.....			2,560	2,220	2,560	2,120	6,860	8,960	2,255	13,460	9,360	.....
28.....			2,330	2,220	2,960	62,360	9,560	12,560	2,560	8,060	8,360	.....
29.....			2,330	2,120	2,440	18,260	13,160	11,060	2,440	5,530	20,960	4,460
30.....			2,330	2,120	2,440	5,780	22,160	14,060	2,820	4,660	13,760	4,865
31.....			2,330	2,020	2,120	5,780	11,960	15,560	2,820	3,910	10,160	4,270
Maximum.			2,560	2,440	2,960	62,360	82,160	52,760	28,460	31,160	61,460	59,360
Minimum.			2,220	1,840	1,930	1,840	2,560	4,960	4,160	2,560	3,105	4,090
Mean.			2,353	2,161	2,162	5,251	11,157	17,267	8,106	8,353	17,822	12,872

Note.—Daily discharges determined from a well-defined curve between 1,800 and 5,800 second-liters. Above and below these values discharges are estimated from extension of curve; applicable from April 12 to September 18, 1919, but can be arbitrarily extended to December 31, 1919. No gauge-height data on dates for which discharges are not given.

Daily and monthly discharges in liters per second, of Pawli River near Santo Domingo, Pili, Camarines Sur, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	4,460	2,960	2,820	2,330	2,120	2,690	11,060	3,600	6,840	4,930	4,470	28,130
2.....	5,780	3,105	2,690	2,440	2,020	2,690	15,260	3,010	8,410	6,840	4,250	17,970
3.....	6,860	2,820	2,820	2,830	2,020	2,690	13,460	2,410	7,090	19,680	14,060	13,000
4.....	6,030	2,690	2,820	2,920	1,930	2,690	8,060	2,270	4,700	12,820	31,190	9,260
5.....	8,360	2,820	2,820	2,120	2,020	2,690	11,660	2,100	4,700	8,410	28,340	25,070
6.....	12,860	3,575	2,820	2,920	2,020	2,690	20,360	2,100	4,700	9,530	11,660	27,620
7.....	8,360	2,960	2,820	2,920	2,120	2,690	20,360	1,930	4,030	7,870	7,870	17,550
8.....	7,160	5,075	2,820	2,920	2,120	2,690	11,960	1,930	2,820	6,590	6,590	11,080
9.....	5,300	4,660	2,560	2,220	2,330	2,690	15,560	2,270	3,810	3,200	5,860	10,120
10.....	4,865	4,660	2,560	2,220	2,440	2,690	14,360	1,610	3,010	4,250	5,160	8,410
11.....	4,970	3,740	2,690	2,440	2,440	2,690	11,060	1,770	2,630	3,600	4,700	7,610
12.....	4,090	4,970	2,560	2,440	2,560	2,690	14,660	1,770	2,820	3,200	4,700	6,840
13.....	17,960	5,330	2,560	2,690	2,560	2,690	22,160	1,770	2,440	4,470	4,470	5,390
14.....	12,860	9,960	2,560	2,440	2,440	2,440	13,460	1,770	2,440	67,910	5,390	4,700
15.....	9,860	7,860	3,105	2,220	2,690	2,440	6,580	2,630	2,270	121,970	12,320	5,160
16.....	7,760	7,160	2,560	2,220	2,690	2,220	5,300	2,100	3,200	128,110	13,000	10,720
17.....	7,760	6,030	2,560	2,220	2,690	2,020	5,300	2,820	2,630	59,240	11,340	14,060
18.....	8,360	4,270	2,560	2,020	2,960	1,840	4,865	2,440	2,440	21,550	6,340	6,340
19.....	6,030	3,410	2,330	2,120	6,300	2,020	9,260	5,860	2,440	16,340	4,930	5,390
20.....	5,075	3,105	2,440	2,020	6,860	1,840	5,780	10,420	4,930	28,130	4,250	4,930
21.....	4,270	2,820	2,440	2,120	6,580	1,840	20,060	7,090	4,930	17,140	4,250	4,700
22.....	4,460	2,960	2,330	2,220	4,270	2,440	19,760	4,030	6,340	14,060	3,200	4,700
23.....	4,090	2,690	2,330	2,220	3,910	2,560	8,660	3,010	9,530	7,090	4,030	4,470
24.....	3,740	2,820	2,440	2,330	3,410	2,690	5,300	2,820	8,970	7,610	2,820	3,810
25.....	3,575	3,105	2,440	2,120	2,820	2,960	4,090	2,630	10,420	6,590	2,820	2,820
26.....	3,575	3,105	2,440	2,020	2,560	3,105	5,300	4,930	45,470	5,860	2,820	3,200
27.....	3,410	2,960	2,330	2,120	2,560	3,910	9,560	5,620	24,560	5,390	2,820	3,200
28.....	3,410	3,575	2,440	2,330	2,690	11,060	9,860	15,560	10,720	4,930	2,820	3,200
29.....	3,255	2,960	2,330	2,440	2,560	9,560	7,160	24,560	8,410	5,390	4,030	3,010
30.....	2,960	.....	2,330	2,330	2,820	10,460	6,300	9,250	5,620	4,030	3,600	2,820
31.....	3,105	.....	2,330	.....	2,440	.....	4,460	8,410	.....	4,470	.....	.....
Maximum.	17,960	9,260	3,105	2,690	6,860	11,060	22,160	24,560	45,470	128,110	31,190	28,130
Minimum.	2,960	2,690	2,330	2,020	1,930	1,840	4,090	1,610	2,270	3,200	2,630	2,820
Mean.	6,245	4,054	2,570	2,254	2,976	3,349	10,604	4,678	7,157	20,023	7,068	8,968



Daily and monthly discharges in liters per second, of Pawli River near Santo Domingo, Pili, Camarines Sur, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	2,820	19,680	4,700	2,820	1,770	2,100	1,930	4,030	24,560	9,530	13,350	48,530
2	3,400	14,060	4,930	2,820	2,100	2,100	2,630	3,600	11,340	7,870	44,960	41,900
3	4,030	5,860	4,470	2,820	1,770	2,100	6,590	3,400	8,160	7,870	55,670	41,900
4	3,400	7,350	4,030	2,820	1,770	2,440	104,650	3,200	12,320	6,590	26,090	46,490
5	2,820	5,860	4,470	2,820	1,770	2,270	52,610	3,200	16,340	6,100	11,980	41,920
6	3,200	4,930	10,720	2,820	1,770	2,100	17,970	3,600	16,340	6,100	11,980	32,720
7	3,200	5,860	103,610	2,820	1,770	2,100	10,120	25,070	19,680	5,160	9,820	25,070
8	3,200	4,930	30,170	2,820	1,770	1,770	7,350	10,420	12,660	4,930	9,530	18,810
9	3,200	10,120	19,240	2,820	1,770	1,770	6,840	29,660	10,420	9,250	57,710	13,350
10	3,200	7,350	10,420	2,820	1,770	2,440	5,160	25,580	15,560	6,840	160,730	13,350
11	3,200	4,250	6,890	2,440	1,770	2,440	4,250	13,350	160,260	7,840	160,730	6,590
12	2,820	3,470	5,840	2,440	1,770	2,440	3,200	6,340	162,300	8,140	32,720	6,590
13	2,820	5,860	5,860	2,440	1,770	2,440	3,200	5,390	29,150	15,180	21,070	88,840
14	2,820	4,030	7,350	2,440	1,770	4,030	3,010	7,350	15,940	17,140	15,180	81,170
15	6,590	3,400	7,350	2,440	1,770	4,030	2,820	8,140	15,940	15,560	12,660	20,600
16	5,820	3,200	6,100	2,440	1,770	4,030	2,820	5,620	11,660	11,340	11,980	12,320
17	5,620	2,820	6,840	2,270	2,270	2,270	3,200	4,470	13,000	8,690	10,420	9,820
18	3,010	2,820	7,090	2,100	2,100	2,270	3,200	4,030	10,420	7,350	9,530	8,690
19	2,820	8,970	5,860	2,100	1,770	3,600	3,810	3,400	8,410	6,590	6,840	10,720
20	2,820	14,060	4,700	2,270	1,770	3,400	4,930	3,200	7,350	5,620	6,100	13,000
21	2,820	10,720	4,250	2,270	1,770	3,400	6,590	2,820	11,660	4,930	104,630	15,180
22	2,440	12,660	4,250	2,100	1,770	4,250	25,070	2,200	34,760	8,140	12,680	11,980
23	2,820	8,410	3,600	2,100	1,770	3,400	27,110	2,870	35,560	4,930	139,370	61,790
24	2,440	13,000	3,600	2,100	1,460	3,200	26,090	3,200	21,810	6,100	139,820	55,160
25	2,630	6,340	3,200	2,100	1,460	2,440	26,090	3,200	18,810	6,840	73,010	13,680
26	2,440	5,860	3,200	2,100	1,460	2,440	13,700	3,200	26,600	5,620	67,400	13,350
27	2,440	5,860	3,200	2,100	1,460	2,100	10,420	3,200	26,600	5,620	67,400	13,350
28	2,440	5,860	3,200	2,100	1,770	2,100	6,340	9,250	13,350	4,930	58,730	10,720
29	3,600	.....	3,200	1,930	1,770	2,100	3,400	18,810	17,970	8,140	59,750	8,970
30	6,590	.....	3,200	1,930	2,100	2,100	3,400	19,680	.....	23,540	.....	8,410
31	8,970	.....	3,200	.....	2,100	.....	3,400	.....	.....	.....	.....	.....
Maximum	8,970	19,680	103,610	3,200	2,270	4,250	104,650	29,660	145,940	23,540	160,730	81,170
Minimum	2,440	2,820	2,820	1,930	1,460	1,770	1,930	2,820	6,340	4,700	6,100	6,340
Mean	3,473	7,455	9,671	2,436	1,798	2,715	12,711	8,066	24,704	8,377	48,180	24,275

Daily and monthly discharges in liters per second, of Pawli River near Santo Domingo, Pili, Camarines Sur, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1..	8,140	3,600	3,200	2,820	3,200	1,770	1,310	39,860	3,010	9,250	4,030	15,940
2..	7,350	5,390	3,600	2,820	3,010	1,930	1,460	25,580	4,030	8,410	3,400	11,660
3..	6,100	6,100	3,200	2,820	2,630	1,770	3,400	12,660	3,400	5,860	15,940	9,530
4..	5,860	4,700	3,200	2,820	2,820	1,610	4,930	8,970	4,250	6,100	30,280	17,140
5..	6,590	4,080	2,820	2,630	2,630	2,270	3,600	7,870	10,120	8,410	38,330	21,550
6..	5,860	6,340	2,820	2,440	2,820	2,100	4,030	30,680	8,410	7,870	11,660	17,140
7..	6,340	4,930	2,820	2,440	2,630	2,270	3,200	31,700	20,600	8,410	8,970	10,720
8..	6,590	4,030	2,820	2,440	2,440	2,100	4,250	15,560	15,560	11,340	7,350	7,870
9..	5,620	4,030	2,820	2,440	2,440	1,770	4,250	9,820	16,340	38,840	5,860	7,350
10..	5,620	3,600	3,200	2,440	2,820	1,930	7,610	7,870	11,340	14,800	5,860	6,340
11..	15,940	3,400	3,200	2,440	3,400	2,100	6,590	8,970	12,320	10,420	5,860	5,390
12..	18,810	3,200	2,820	2,440	2,440	2,100	4,470	7,350	13,350	12,320	5,860	4,940
13..	9,250	3,200	3,010	2,820	2,630	2,100	3,200	4,700	14,800	10,420	10,720	5,160
14..	10,720	3,200	3,200	2,820	2,440	1,770	2,820	4,700	11,340	8,690	15,560	4,470
15..	8,140	3,200	3,010	2,820	2,440	1,770	2,100	8,140	15,560	7,350	18,810	4,030
16..	8,690	3,600	3,010	2,820	2,440	2,100	3,200	30,680	8,970	6,340	11,660	9,250
17..	6,840	3,200	3,200	2,820	2,440	2,100	4,030	32,720	17,350	5,160	5,340	6,590
18..	5,860	2,820	3,200	2,440	2,440	1,770	18,680	14,800	14,820	4,700	5,340	27,660
19..	5,390	3,200	3,200	2,440	2,440	1,770	18,680	9,250	13,440	4,700	5,340	27,660
20..	5,390	3,200	2,820	2,440	2,440	1,770	18,680	5,910	13,440	4,700	5,340	27,660
21..	5,390	3,200	2,820	2,440	2,440	1,770	27,110	5,910	39,370	3,600	15,390	135,230
22..	5,390	3,200	2,820	2,440	2,440	1,770	35,730	3,600	39,370	3,600	10,720	28,130
23..	5,390	3,200	2,820	2,440	2,440	1,770	35,730	3,600	39,370	3,600	10,720	17,140
24..	5,390	3,200	2,820	2,440	2,440	1,770	35,730	3,600	39,370	3,600	10,720	17,140
25..	4,030	3,200	2,820	2,440	2,440	1,660	14,060	3,600	43,940	3,600	6,340	26,600
26..	4,030	3,200	2,820	2,440	2,440	1,660	14,060	3,200	52,100	3,200	6,340	28,130
27..	4,470	3,200	2,820	2,440	2,440	1,660	13,350	2,820	137,780	2,820	6,340	21,550
28..	5,160	3,200	7,870	2,440	2,440	880	29,660	2,630	116,360	2,820	114,830	29,150
29..	4,470	3,200	4,470	2,440	2,100	1,660	29,660	2,270	59,240	4,470	186,780	24,560
30..	4,030	.....	3,810	2,440	2,440	880	11,030	2,100	24,050	12,600	76,780	16,340
31..	4,030	.....	3,200	2,630	2,100	1,160	10,720	2,100	14,800	9,250	108,200	41,020
	4,030	.....	3,010	.....	1,930	.....	{ 133,700 }	2,100	.....	3,600	.....	64,340
Maximum	18,810	6,340	7,870	2,820	3,400	2,270	133,700	39,860	137,780	38,840	114,830	135,230
Minimum	4,030	2,820	2,440	2,100	1,930	880	1,310	2,100	3,010	2,820	3,400	3,600
Mean	6,848	3,735	3,210	2,432	2,586	1,750	15,295	11,448	25,288	8,176	21,610	21,543

## CAMARINES SUR PROVINCE

## RANGAS RIVER, GOA

**LOCATION.**—In the barrio of Matacla, about 900 m. northwest from monument of Km. 50 on the Tigaon-Goa road.

**RECORDS AVAILABLE.**—From July 14, 1922, to December 31, 1922.

**GAGE.**—Standard metric-gage board vertically fastened to a big boulder on the right bank of the river.

**DISCHARGE MEASUREMENT.**—Made by wading 1 m. below the gage.

**CHANNEL AND BANKS.**—One channel at all stages; straight for 30 m. above and 20 m. below the station. Bed of stream composed of large boulders and gravels. Right bank high and rocky; left bank low, containing boulders and covered with brushes.

**EXTREMES OF DISCHARGE.**—Maximum discharge during period of observation, 12,835 second-liters on December 27, 1922; minimum discharge, 250 second-liters on October 24-26, 1922.

**DIVERSIONS.**—Part of water diverted below the station to irrigate rice lands.

**REGULATION.**—None.

**UTILIZATION.**—For irrigation purposes.

**ACCURACY.**—Gage read twice daily. Records poor due to big boulders which affect discharge measurements.

*Discharge measurements of Rangas River, near Matacla, Goa,  
Camarines Sur*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1922</b>				
July 14 . . . . .	O. Buenaventura	.28	885	. . . . .
July 19 . . . . .	do.	.28	745	. . . . .
July 20 . . . . .	do.	.28	852	. . . . .
August 9 . . . . .	do.	.29	846	. . . . .
August 23 . . . . .	do.	.26	722	. . . . .
August 30 . . . . .	do.	.23	564	. . . . .
September 13 . . . . .	do.	.26	726	. . . . .
September 22 . . . . .	do.	.32	1,189	. . . . .
September 23 . . . . .	do.	.27	747	. . . . .
October 2 . . . . .	do.	.30	1,157	. . . . .
October 14 . . . . .	do.	.26	853	. . . . .
October 20 . . . . .	do.	.24	877	. . . . .
October 28 . . . . .	do.	.19	670	. . . . .
November 2 . . . . .	do.	.20	743	. . . . .
November 18 . . . . .	do.	.24	807	. . . . .
December 5 . . . . .	do.	.38	1,691	. . . . .
December 16 . . . . .	do.	.30	1,131	. . . . .

Daily and monthly discharges, in liters per second, of Rangas River near Matacla, Goa, Camarines Sur, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1								948	500	700	948	2,188
2								1,136	948	858	948	2,188
3								3,986	776	630	1,365	1,895
4								3,986	776	564	1,136	2,188
5								1,620	776	564	948	2,502
6								948	948	564	948	1,895
7								776	776	630	948	1,486
8								776	630	630	776	1,136
9								948	700	776	858	948
10								776	776	948	948	858
11								700	776	948	948	1,098
12								776	776	1,620	1,620	1,098
13								858	776	776	3,041	948
14							948	776	776	776	948	948
15							948	776	948	858	776	948
16								948	1,136	776	858	1,895
17								2,830	1,620	776	630	1,620
18								1,895	948	776	630	2,041
19								948	776	630	630	2,342
20							858	858	776	630	948	3,005
21							1,365	948	776	564	2,188	3,376
22							2,041	776	1,365	292	1,136	3,376
23							2,342	776	2,041	250	948	3,570
24							948	776	1,895	250	948	3,570
25							1,620	776	2,342	250	948	4,460
26								500	2,502	292	3,188	12,835
27							1,136	630	2,502	390	3,986	3,188
28							1,136	948	1,754	948	4,460	3,188
29							2,502	500	1,754	858	1,620	3,570
30							3,005	500	948	776	.....	3,570
31								500	.....	776	.....	.....
Maximum							3,188	3,986	2,502	948	4,460	12,835
Minimum							1,620	500	500	250	858	858
Mean							1,623	1,135	1,123	653	1,372	2,692

NOTE.—Gage heights not recorded on days for which discharge is not given. Discharge determined from poorly defined rating curve.

## CAMARINES SUR PROVINCE

## WARAS RIVER, BAAO

**LOCATION.**—About 33.7 km. from Nueva Caceres and 4.3 km. from Iriga on Nueva Caceres-Iriga Road, below concrete bridge.

**RECORDS AVAILABLE.**—From November 26, 1919, to May 31, 1922. Also from March 20, 1910, to March 30, 1912, inclusive, at old station at exactly the same location as the present.

**GAGE.**—Standard metric-gage board of two sections attached vertically to abutment of bridge.

**DISCHARGE MEASUREMENT.**—Made from bridge at section of gage.

**CHANNEL AND BANKS.**—Channel is straight for 100 m. above and for 80 m. below gaging station; right bank high, left bank low, and subject to overflow. At measuring section stream bed of sandy and gravelly texture; shifting at high water stage.

**EXTREMES OF DISCHARGE.**—Maximum discharge during period of observation, 44,180 second-liters on November 25, 1921; minimum discharge, 66 second-liters on May 17, 1910.

**DIVERSIONS.**—Dam below the station affecting flow.

**REGULATION.**—None.

**UTILIZATION.**—For irrigation purposes.

**ACCURACY.**—Daily discharge estimated from a fairly well-defined curve between 500 to 2,500 second-liters, applicable from March 20, 1910, to March 30, 1912. Daily discharge from November 26 to December 31, 1920, determined from a well-defined curve from 760 to 1,410 second-liters. Discharges for 1921 and 1922 determined from fairly well-defined rating curves. Gage read twice daily.

*Discharge measurements of Waras River, near San Juan, Baa, Camarines Sur*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1910</b>				
March 18. . . . .	J. I. Quinn. . . . .	.65	2,320	
April 7. . . . .	do. . . . .	.39	2,000	
May 11. . . . .	do. . . . .	.34	2,080	
June 28. . . . .	do. . . . .	.33	2,360	
August 19. . . . .	do. . . . .	.46	2,980	
September 3. . . . .	do. . . . .	.80	597	
September 3. . . . .	do. . . . .	.80	577	
October 21. . . . .	H. V. Hall. . . . .	.68	862	
November 5. . . . .	do. . . . .	1 05	2,070	
November 5. . . . .	do. . . . .	1 05	2,010	
November 16. . . . .	J. I. Quinn. . . . .	.99	1,840	
November 16. . . . .	do. . . . .	1 00	2,660	
November 19. . . . .	do. . . . .	.87	1,240	
December 1. . . . .	do. . . . .	.74	1,560	
December 6. . . . .	do. . . . .	.88	3,810	
December 22. . . . .	do. . . . .	1 07	9,700	
<b>1911</b>				
January 6. . . . .	W. Demers. . . . .	.69	1,902	
January 14. . . . .	do. . . . .	.67	1,442	
January 26. . . . .	do. . . . .	.62	570	
February 6. . . . .	do. . . . .	.60	360	
February 14. . . . .	do. . . . .	.68	1,103	
February 17. . . . .	do. . . . .	.82	2,610	
March 2. . . . .	do. . . . .	.75	1,774	
March 7. . . . .	do. . . . .	.66	853	
March 18. . . . .	do. . . . .	.63	651	

**NOTE.**—Gage heights from July 31, 1919, referred to a datum of different elevation. Gage heights and measurement affected by dam since July 6, 1920.

*Discharge measurements of Waras River, near San Juan, Baao,  
Camarines Sur—Continued*

Date	Made by—	Gage height (meters)	Discharge (second- liters)	Remarks
<b>1911</b>				
March 22	W. Demers	63	612	
March 24	do.	61	463	
April 8	do.	60	410	
April 10	do.	84	2,880	
April 21	do.	70	460	
April 26	do.	71	450	
May 9	do.	73	650	
May 23	do.	72	550	
June 7	do.	67	350	
July 7	do.	77	1,050	
July 20	do.	84	2,340	
August 4	do.	76	830	
<b>1919</b>				
July 31	A. Fegarido	32	1,820	
December 9	A. Fegarido and M. Canas	75	1,300	
December 23	do.	73	1,580	
<b>1920</b>				
January 19	M. B. Canas	72	1,410	
February 9	do.	60	1,240	
March 10	do.	56	970	
March 15	do.	54	890	
April 13	do.	53	950	
April 20	do.	54	960	
May 8	do.	47	760	
May 15	do.	50	830	
June 9	do.	58	1,270	
June 16	do.	48	1,130	
December 26	O. Buenaventura	1 29	393	
<b>1921</b>				
January 13	do.	1 11	424	
January 13	do.	1 11	422	
January 24	do.	1 10	344	
February 8	do.	60	63	Unreliable measurement.
March 11	do.	92	3,038	
March 17	do.	72	947	
March 24	do.	68	697	
March 29	do.	65	594	
April 23	do.		353	
July 12	do.	87	2,051	
July 25	do.	78	442	
August 8	do.	85	1,050	
August 19	do.	66	193	
September 12	do.	1 07	6,336	
December 20	do.	1 49	10,358	
December 28	do.	1 44	8,625	
<b>1922</b>				
January 5	do.	1 28	6,283	
January 10	do.	1 34	7,007	
January 17	do.	1 38	6,033	
January 25	do.	1 22	5,039	
February 24	do.	96	583	
April 5	do.	76	334	

Daily and monthly discharges, in liters per second, of Waras River near San Juan, Baao, Camarines Sur, for the year 1910

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....				375	92	164	112	1,222	2,972	3,563	9,920	1,142
2.....				206	99	164	98	1,061	1,886	1,997	13,150	1,585
3.....				182	105	140	206	853	1,774	15,570	9,529	1,396
4.....				206	99	121	130	1,061	1,539	6,539	6,539	8,193
5.....				194	85	112	79	901	1,997	3,711	5,128	7,637
6.....				170	85	105	99	853	1,585	2,588	4,455	2,716
7.....				149	105	105	85	805	1,061	1,774	3,860	1,886
8.....				149	92	105	78	626	2,460	1,396	3,415	1,396
9.....				130	88	105	78	626	1,142	8,006	2,972	1,302
10.....				130	85	121	72	588	805	2,972	2,972	1,385
11.....				130	105	121	72	588	1,774	1,396	2,972	1,385
12.....				130	105	121	72	588	1,774	1,396	1,997	1,061
13.....				121	85	140	218	552	1,061	1,061	19,530	901
14.....				112	78	121	194	444	901	805	8,193	853
15.....				112	78	130	398	398	1,396	660	5,296	1,222
16.....				112	72	92	375	421	1,491	592	4,157	981
17.....				130	66	85	206	467	1,774	558	3,268	4,791
18.....				105	72	85	158	756	805	524	2,844	1,997
19.....				99	72	89	121	230	853	467	2,460	1,302
20.....			299	112	66	105	255	2,716	2,716	558	2,332	1,061
21.....		267	217	105	105	105	105	2,460	1,774	708	2,332	1,061
22.....		217	217	112	99	99	92	2,460	3,415	708	2,332	1,061
23.....		217	217	112	99	99	92	2,460	3,415	708	2,332	1,061
24.....		217	217	112	99	99	92	2,460	3,415	708	2,332	1,061
25.....		217	217	112	99	99	92	2,460	3,415	708	2,332	1,061
26.....		217	217	112	99	99	92	2,460	3,415	708	2,332	1,061
27.....		217	217	112	99	99	92	2,460	3,415	708	2,332	1,061
28.....		217	217	112	99	99	92	2,460	3,415	708	2,332	1,061
29.....		217	217	112	99	99	92	2,460	3,415	708	2,332	1,061
30.....		217	217	112	99	99	92	2,460	3,415	708	2,332	1,061
31.....		217	217	112	99	99	92	2,460	3,415	708	2,332	1,061
Maximum	299	299	299	375	432	356	2,109	6,358	10,341	15,570	20,410	17,110
Minimum	188	188	188	147	66	85	72	230	558	467	1,396	1,396
Mean	208	208	208	147	117	126	486	1,349	1,737	2,053	6,356	3,905

NOTE.—Daily discharge determined from a fairly well-defined curve from 500 to 2,500 second-liters. Below and above these values, discharges are estimated from the extension of rating curve. Applicable from March 20, 1910 to December 31, 1910. Records from March 20 to July 22, 1910 are unreliable.

Daily and monthly discharges, in liters per second, of Waras River near San Juan, Baao, Camarines Sur, for the year 1911

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	1,997	558	1,585	592	805	708	15,570	1,222	8,943	10,762	13,810	12,050
2.....	1,585	524	1,222	592	901	708	8,006	1,061	12,050	9,820	13,810	10,762
3.....	1,222	490	1,061	568	1,061	708	3,415	805	11,619	9,820	13,370	10,762
4.....	1,853	490	901	568	901	708	2,332	805	12,050	10,341	13,050	10,341
5.....	1,222	558	805	558	1,061	708	1,997	626	12,050	9,820	12,710	9,834
6.....	1,901	490	756	524	1,585	853	1,774	626	13,370	14,590	12,910	8,166
7.....	901	708	708	490	1,585	756	1,585	526	14,030	10,130	14,030	8,166
8.....	1,061	558	660	524	1,132	708	1,491	526	15,350	10,130	14,030	8,166
9.....	1,585	490	660	490	1,774	708	6,726	526	23,490	10,130	12,050	7,268
10.....	1,853	490	626	2,585	1,774	756	2,720	490	15,350	12,050	12,050	7,268
11.....	1,853	1,222	1,222	1,396	1,396	708	2,720	2,585	15,350	12,050	11,619	6,902
12.....	1,396	1,222	1,222	1,396	1,061	708	1,997	2,585	15,350	12,050	11,619	6,902
13.....	1,396	1,222	708	1,141	901	708	18,650	10,130	14,700	16,590	11,883	7,637
14.....	1,396	1,222	708	1,141	901	708	18,650	10,130	14,700	16,590	11,883	7,637
15.....	756	1,222	592	901	901	853	18,650	10,130	13,590	11,110	10,972	7,084
16.....	708	5,824	558	901	901	708	34,050	10,972	14,700	16,590	11,883	6,721
17.....	901	2,460	626	901	901	708	7,057	10,972	14,700	16,590	11,883	9,725
18.....	1,997	558	558	901	901	708	4,791	9,920	13,810	16,010	11,403	9,725
19.....	626	8,756	592	1,061	901	856	3,711	11,188	14,910	17,110	11,403	8,568
20.....	626	2,844	558	901	805	901	3,268	14,250	14,910	16,890	10,972	8,006
21.....	558	5,824	558	805	901	805	2,220	13,370	13,810	15,350	10,180	7,637
22.....	558	6,176	708	853	1,222	756	2,220	10,551	17,330	14,030	10,180	7,453
23.....	558	4,009	524	1,061	1,491	708	1,886	9,920	17,550	13,590	10,130	6,902
24.....	626	2,332	490	2,588	901	708	1,774	10,341	15,130	13,590	9,725	6,858
25.....	558	1,585	490	2,588	901	708	1,558	10,341	13,810	13,590	9,384	5,824
26.....	626	2,332	490	1,142	805	708	1,302	9,138	10,762	12,270	8,150	5,472
27.....	558	3,415	1,302	981	901	660	1,222	8,943	10,762	12,050	7,822	5,296
28.....	1,997	3,415	1,302	981	1,061	708	1,302	8,943	10,762	12,050	7,822	5,296
29.....	558	2,220	1,396	1,061	901	660	1,302	8,006	10,972	12,050	7,822	5,128
30.....	558	.....	901	981	805	756	1,396	7,453	12,270	12,050	8,006	5,824
31.....	558	.....	660	901	805	660	1,222	7,264	11,619	12,050	10,551	6,902
31.....	558	.....	626	.....	805	.....	1,585	6,539	.....	12,930	.....	7,208
Maximum	1,997	8,756	1,997	2,844	1,774	901	34,050	14,250	23,490	17,110	14,030	12,050
Minimum	.....	444	490	490	805	660	1,222	467	8,943	9,725	7,822	6,128
Mean	857	2,264	807	1,014	1,051	735	5,120	6,385	14,026	13,328	11,031	7,738

NORG.—Daily discharge determined from fairly well-defined curve from 500 to 2,000 second-liters, applicable throughout the year.



Daily and monthly discharges, in liters per second, of Waras River near San Juan, Baao, Camarines Sur, for the year 1912

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	7,084	4,458	2,844									
2	7,084	4,623	2,588									
3	7,268	4,458	2,109									
4	7,453	4,458	1,886									
5	8,006	4,458	1,886									
6	8,581	3,911	1,774									
7	8,581	3,911	1,680									
8	8,383	2,716	1,580									
9	8,006	3,268	1,396									
10	7,637	3,268	1,302									
11	7,268	3,563	1,302									
12	7,822	2,972	1,302									
13	7,822	3,268	1,396									
14	8,193	3,120	1,302									
15	7,637	2,844	1,222									
16	7,268	2,844	1,142									
17	7,268	2,972	1,142									
18	7,268	2,972	1,142									
19	6,902	2,844	1,061									
20	6,902	3,120	901									
21	6,539	13,370	853									
22	6,539	8,381	805									
23	6,358	5,824	805									
24	6,176	4,960	756									
25	5,824	4,455	756									
26	5,824	3,860	756									
27	5,648	3,711	756									
28	5,648	3,711	756									
29	5,472	3,268	660									
30	5,472	3,268	660									
31	4,623	.....	.....									
Maximum	8,568	13,370	2,844									
Minimum	4,623	2,716	660									
Mean	6,955	4,175	1,275									

Note.—Daily discharges determined from fairly well-defined curve between 500 to 2,000 second-liters, applicable from January 1 to March 30, 1912. Station abandoned after March 30, 1912. Reestablished November 26, 1919.

*Daily and monthly discharges, in liters per second, of Waras River near San Juan, Baao, Camarines Sur, for the year 1919*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	.	.	.	.	.	.	.	.	.	.	.	1,815
2.....	.	.	.	.	.	.	.	.	.	.	.	1,638
3.....	.	.	.	.	.	.	.	.	.	.	.	1,755
4.....	.	.	.	.	.	.	.	.	.	.	.	1,875
5.....	.	.	.	.	.	.	.	.	.	.	.	2,631
6.....	.	.	.	.	.	.	.	.	.	.	.	1,875
7.....	.	.	.	.	.	.	.	.	.	.	.	1,668
8.....	.	.	.	.	.	.	.	.	.	.	.	1,581
9.....	.	.	.	.	.	.	.	.	.	.	.	1,495
10.....	.	.	.	.	.	.	.	.	.	.	.	1,495
11.....	.	.	.	.	.	.	.	.	.	.	.	1,467
12.....	.	.	.	.	.	.	.	.	.	.	.	1,459
13.....	.	.	.	.	.	.	.	.	.	.	.	1,411
14.....	.	.	.	.	.	.	.	.	.	.	.	1,355
15.....	.	.	.	.	.	.	.	.	.	.	.	1,355
16.....	.	.	.	.	.	.	.	.	.	.	.	1,328
17.....	.	.	.	.	.	.	.	.	.	.	.	1,355
18.....	.	.	.	.	.	.	.	.	.	.	.	1,411
19.....	.	.	.	.	.	.	.	.	.	.	.	2,637
20.....	.	.	.	.	.	.	.	.	.	.	.	1,755
21.....	.	.	.	.	.	.	.	.	.	.	.	1,467
22.....	.	.	.	.	.	.	.	.	.	.	.	1,411
23.....	.	.	.	.	.	.	.	.	.	.	.	1,439
24.....	.	.	.	.	.	.	.	.	.	.	.	1,383
25.....	.	.	.	.	.	.	.	.	.	.	.	1,355
26.....	.	.	.	.	.	.	.	.	.	.	.	1,355
27.....	.	.	.	.	.	.	.	.	.	.	1,467	1,467
28.....	.	.	.	.	.	.	.	.	.	.	1,608	1,608
29.....	.	.	.	.	.	.	.	.	.	.	1,598	1,598
30.....	.	.	.	.	.	.	.	.	.	.	1,551	1,551
31.....	.	.	.	.	.	.	.	.	.	.	1,524	1,639
Maximum.....	.	.	.	.	.	.	.	.	.	.	1,698	2,637
Minimum.....	.	.	.	.	.	.	.	.	.	.	1,467	1,328
Mean.....	.	.	.	.	.	.	.	.	.	.	1,570	1,577

NOTE.—Daily discharge determined from a well-defined curve from 760 to 1,410 second-liters. No record on days for which discharge is not given.

Daily and monthly discharges, in liters per second, of Waras River near San Juan, Bazo, Camarines Sur, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	1,411	1,167	1,089	881	759	783	1,439	2,573	2,957	2,861	1,167	* 1,581
2.....	1,411	1,167	1,089	881	759	783	1,297	2,573	2,925	2,861	1,297	2,589
3.....	1,411	1,167	1,089	855	759	1,037	1,291	2,573	2,893	2,861	1,291	2,413
4.....	1,411	1,115	1,089	855	759	1,247	1,141	2,413	2,893	3,213	2,413	* 1,552
5.....	1,697	1,115	1,063	855	759	1,301	1,167	2,349	2,701	3,373	1,581	* 1,581
6.....	1,668	1,115	1,037	855	759	1,411	2,253	2,317	2,381	3,437	1,581	* 1,581
7.....	1,495	1,115	1,011	855	759	1,467	2,661	2,317	2,285	3,277	1,785	2,509
8.....	1,411	1,115	985	855	759	1,581	2,893	2,317	2,445	3,213	1,785	2,317
9.....	1,383	1,089	985	855	759	1,639	2,861	2,253	2,829	3,181	2,093	2,285
10.....	1,355	1,089	985	831	759	1,639	2,947	2,189	2,573	3,149	* 1,936	* 1,439
11.....	1,355	1,089	959	831	759	1,697	2,989	2,253	2,445	3,117	* 1,815	* 1,411
12.....	1,328	1,089	959	831	735	1,815	2,957	2,189	2,445	2,989	* 1,697	* 1,328
13.....	3,063	1,089	959	907	735	1,815	2,861	2,125	2,477	2,989	1,639	2,701
14.....	1,639	1,089	959	831	783	2,381	2,753	2,125	2,381	3,853	1,639	2,573
15.....	1,581	1,552	933	831	783	2,859	2,753	2,125	2,413	5,453	1,636	* 1,697
16.....	1,581	1,511	933	859	783	2,573	2,753	2,125	2,413	5,453	* 1,636	* 1,636
17.....	1,467	1,291	933	1,037	859	2,235	2,701	2,349	2,349	1,636	* 1,636	* 1,636
18.....	1,411	1,167	907	1,089	885	1,926	3,085	2,413	2,253	1,610	* 1,728	* 1,688
19.....	1,355	1,141	907	933	1,193	1,875	3,213	2,477	2,253	1,639	* 1,728	2,125
20.....	1,328	1,115	881	933	1,907	1,815	3,213	2,573	2,253	1,581	* 1,728	* 1,610
21.....	1,301	1,115	881	807	831	1,998	3,213	2,253	2,541	1,495	* 1,668	* 1,610
22.....	1,274	1,089	959	807	831	2,605	3,149	2,221	2,637	1,328	* 1,610	* 1,610
23.....	1,247	1,089	959	807	855	2,413	3,085	2,189	3,053	1,193	* 1,523	* 1,581
24.....	1,247	1,089	907	783	831	2,925	3,085	2,125	3,053	1,247	* 1,523	* 1,581
25.....	1,247	1,089	907	783	783	2,253	2,957	2,125	3,213	1,247	* 1,495	* 1,467
26.....	1,220	1,089	907	783	783	881	2,957	2,285	3,245	1,220	* 1,467	* 1,467
27.....	1,193	1,141	907	783	783	881	2,957	2,445	3,213	1,220	* 1,467	* 1,467
28.....	1,167	1,193	881	759	783	1,355	2,957	3,309	3,149	1,220	* 1,467	* 1,328
29.....	1,167	1,089	881	783	881	1,639	2,925	3,149	3,085	1,193	* 1,467	* 1,328
30.....	1,167	.....	881	.....	759	.....	2,859	2,957	.....	.....	.....	* 1,301
31.....	1,167	.....	881	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maximum.....	3,063	1,552	1,089	1,089	1,193	2,995	3,661	3,349	3,245	5,453	2,413	2,701
Minimum.....	1,167	1,086	881	759	735	1,780	1,141	2,253	2,253	1,495	1,167	1,301
Mean.....	1,431	1,146	959	860	841	1,780	2,701	2,389	2,589	2,457	1,675	1,586

Note.—Daily discharges determined from a well-defined curve. Discharges marked with an asterisk (\*) show that same were adjusted due to dam effect.

Daily and monthly discharges, in liters per second, of Waras River near San Juan, Baao, Camarines Sur, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	1,328	2,285	668	406	406	120	193	320	10,160	10,160	12,160	11,440
2.....	1,328	2,765	717	406	275	161	176	320	8,520	9,955	12,160	10,580
3.....	1,875	1,467	541	376	176	321	211	320	5,680	10,160	17,045	10,370
4.....	1,610	1,355	376	541	161	176	39,380	355	5,360	10,160	14,700	10,370
5.....	1,439	1,220	406	4,070	146	120	3,035	320	5,320	9,340	12,820	11,660
6.....	1,383	1,141	26,510	6,150	133	120	2,005	390	6,340	8,130	12,780	11,660
7.....	1,328	1,115	2,610	6,720	133	120	1,585	7,020	8,725	11,880	11,880	10,160
8.....	1,467	1,089	3,200	5,630	146	120	1,270	1,065	11,880	6,160	12,100	9,750
9.....	2,509	1,141	1,878	4,230	176	1,116	1,000	1,270	10,580	6,000	12,560	9,340
10.....	2,477	1,668	2,350	3,880	176	2,880	870	1,740	17,870	6,680	44,180	8,725
11.....	2,573	2,477	1,417	3,700	161	2,895	815	1,420	19,910	8,130	21,780	8,130
12.....	2,541	1,677	878	3,627	146	1,682	705	1,130	24,980	10,580	16,770	7,740
13.....	2,605	1,089	717	3,362	133	2,776	695	870	18,125	11,750	15,200	15,740
14.....	2,641	1,089	581	3,200	133	2,476	695	605	14,200	11,580	13,720	15,740
15.....	2,509	1,141	623	2,612	133	2,880	515	560	12,780	12,780	11,000	15,740
16.....	1,755	1,431	384	2,920	161	5,630	470	565	12,440	12,440	11,000	15,740
17.....	1,905	1,089	334	2,104	176	1,386	430	255	10,470	12,550	10,790	8,520
18.....	1,965	1,089	822	1,986	211	13,080	430	200	10,370	10,580	10,580	8,130
19.....	1,247	1,089	768	1,776	211	1,080	470	175	9,955	9,750	10,160	8,325
20.....	1,193	1,905	717	1,776	211	8,680	515	175	8,725	8,130	10,580	9,955
21.....	2,573	2,253	717	1,682	253	7,010	650	175	7,935	7,380	16,240	9,340
22.....	2,573	1,785	668	1,589	211	3,362	650	175	7,740	6,680	17,320	7,935
23.....	2,573	1,523	717	1,417	231	1,337	760	150	8,725	6,340	17,045	7,740
24.....	2,573	1,338	623	1,338	253	1,689	650	130	11,440	7,020	44,180	11,880
25.....	2,573	2,350	541	1,262	253	1,589	650	110	11,880	8,130	20,220	17,320
26.....	2,573	2,768	470	1,187	297	1,500	760	110	26,580	7,740	15,200	10,580
27.....	2,573	541	406	1,116	321	993	560	130	14,200	7,020	13,240	7,740
28.....	2,573	.....	437	878	193	253	470	430	12,100	6,340	12,820	7,380
29.....	2,669	.....	437	541	146	211	390	2,290	11,000	11,880	11,880	6,680
30.....	1,936	.....	437	.....	.....	.....	320	7,020	.....	11,000	.....	6,000
31.....	1,668	.....	437	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maximum.....	2,669	2,861	26,510	6,720	406	13,300	39,380	7,020	26,580	16,240	44,180	17,320
Minimum.....	1,193	1,541	376	376	205	120	176	110	5,360	6,000	10,160	6,000
Mean.....	1,996	1,484	1,680	2,406	205	2,692	1,987	782	11,829	8,918	15,835	9,753

NOTE.—Discharge determined from fairly well-defined rating curve, applicable from February 26 to July 3, 1921. Fair between 450 to 3,300 second-liters. Accuracy of discharges for March 7 and July 4, quite doubtful.

Daily and monthly discharges, in liters per second, of Waras River near San Juan, Baao, Camarines Sur, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	6,170	4,040	1,345	355	175							
2	6,170	4,180	1,500	320	150							
3	6,340	4,460	1,355	355	175							
4	6,170	3,400	1,270	320	200							
5	6,000	4,460	1,130	320	150							
6	7,380	5,680	1,000	355	150							
7	7,740	4,320	870	355	150							
8	7,560	3,275	935	320	130							
9	6,850	2,920	1,000	285	130							
10	8,325	2,810	1,130	355	285							
11	4,750	2,700	1,130	320	200							
12	10,370	2,890	1,065	285	150							
13	9,335	2,530	1,000	350	150							
14	5,360	2,530	875	320	175							
15	5,860	2,530	975	320	175							
16	7,740	2,290	1,000	285	150							
17	5,040	1,270	1,065	250	130							
18	3,775	2,005	870	225	110							
19	3,525	2,100	935	225	110							
20	5,040	1,910	705	225	130							
21	4,180	1,910	560	225	110							
22	5,840	1,740	470	200	130							
23	5,200	1,925	390	225	130							
24	5,895	1,910	390	200	110							
25	4,750	1,580	390	175	110							
26	4,180	1,420	390	250	100							
27	4,460	1,580	1,910	250	110							
28	5,395	1,580	1,000	230	110							
29	4,320	1,580	1,000	175	175							
30	4,320	1,580	470	175	150							
31	4,180	390	390	175	130							
Maximum	10,370	5,680	1,910	355	285							
Minimum	3,525	1,270	390	175	100							
Mean	5,735	2,669	911	271	146							

NOTE.—Discharge determined from fairly well-defined rating curve. A applicable from July 4, 1921, to May 31, 1922. Fair below 10,000 second-liters. No record on days for which discharge is not given.

# CAPIZ PROVINCE

## ACLAN RIVER, MALINAO

**LOCATION.**—At 20 m. above the Aclan River Ferry of the Banga-Malinao Road.

**RECORDS AVAILABLE.**—From September 8, 1919, to December 31, 1922.

**GAGE.**—Inclined staff anchored to rocks at left bank of the river.

**DISCHARGE MEASUREMENTS.**—Made from boat at 10 m. below the gage.

**CHANNEL AND BANKS.**—Channel only one at all stages; straight for over 300 m. above and below the station. Right bank low and subject to overflow; left bank over a meter high. Stream bed gravelly and shifting. Flow uniform at ordinary stage but at high, current swift.

**EXTREMES OF DISCHARGE.**—Maximum discharge recorded during period of observation, 541,100 second-liters on May 22, 1922; minimum discharge, 11,700 second-liters on May 31, 1920.

**DIVERSIONS.**—None.

**REGULATION.**—None.

**UTILIZATION.**—For irrigation purposes.

**ACCURACY.**—Daily discharge determined from a fairly well-defined curve from 30,000 to 90,000 second-liters. Applicable throughout the period of observation. Gage read twice daily.

*Discharge measurements of Aclan River, near Poblacion, Malinao, Capiz*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1919</b>				
October 3	C. Daquil ..	1 39	44,335	
October 26	do	3 22	418,290	
November 10	do	2 40	232,778	
December 15	do	1 54	90,147	
<b>1920</b>				
January 10	do	1 78	125,415	
March 12	do	1 16	38,942	
April 15	do	.90	29,283	
May 14	do	.78	21,466	
June 18	R. Ylagan and T. Mendoza	.94	33,161	
July 3	C. Daquil	1 06	47,559	
August 18	R. Ylagan	.96	33,251	
September 17	T. Mendoza	1.40	92,298	
September 19	do	1.79	173,345	
<b>1921</b>				
November 17	do	1.86	146,991	
November 18	do	1.72	69,800	
<b>1922</b>				
July 11	S. Malapit	2.40	20,400	
July 22	do	2.34	14,164	
August 21	do	1.64	6,820	
September 25	do	1.75	6,300	
September 30	do	1.80	7,784	
October 6	H. I. Fernandez	1.60	56,821	
October 9	do	1.62	67,544	
November 18	do	1.70	84,300	
November 20	do	1.76	103,200	
December 28	do	2.18	203,000	
December 29	do	1.88	126,300	

Daily and monthly discharges, in liters per second, of Aclan River near Santiago, Malinao, Capiz, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.										79,700	177,000	185,800
2.										75,700	238,500	196,800
3.										75,700	152,800	205,600
4.										82,700	140,700	322,200
5.										83,700	203,400	331,100
6.										71,700	155,000	190,200
7.										85,700	141,800	150,600
8.									71,700	106,600	159,400	136,300
9.									79,700	102,200	189,100	122,000
10.									79,700	195,700	183,600	107,700
11.									91,700	124,200	128,600	118,700
12.									79,700	102,200	103,800	106,500
13.									76,700	89,700	92,900	112,100
14.									133,000	173,700	87,700	87,700
15.									108,800	337,800	83,700	73,700
16.									91,700	174,500	81,700	93,700
17.									134,100	134,100	80,700	98,700
18.									139,100	102,400	102,400	117,600
19.									113,300	108,800	140,700	405,800
20.									100,900	125,300	134,100	232,000
21.									95,700	113,200	135,200	155,000
22.									113,200	113,200	123,100	126,400
23.									137,400	91,700	123,100	123,100
24.									102,200	113,200	106,600	119,800
25.									93,700	130,800	178,100	118,700
26.									130,800	241,900	159,400	130,800
27.									104,400	159,400	306,800	137,400
28.									91,700	127,500	271,600	126,400
29.									85,700	128,600	206,600	170,400
30.									84,700	200,100	188,000	339,800
31.									.....	222,600	.....	260,600
Maximum.									189,100	337,800	306,800	405,800
Minimum									71,700	71,700	86,700	78,700
Mean.									101,752	133,503	151,480	167,006

Daily and monthly discharges, in liters per second, of Aclan River near Santiago, Malinao, Capiz, for the year 1920

Day	Month											
	January	February	March	April	May	June	July	August	September	October	November	December
1.....	212,260	58,000	123,100	89,100	35,500	45,400	54,400	56,200	375,000	137,400	84,700	137,400
2.....	260,600	56,200	115,400	37,300	28,300	27,400	45,400	41,700	220,600	119,800	83,700	130,800
3.....	218,800	53,500	101,100	37,700	23,000	18,100	36,400	58,100	267,800	136,300	123,100	156,100
4.....	194,600	50,800	87,700	79,700	19,800	22,200	51,700	43,600	174,800	127,500	447,600	139,600
5.....	201,200	49,000	80,700	67,700	17,300	18,100	63,700	39,100	145,100	126,400	436,600	146,200
6.....	194,600	49,000	75,700	54,400	42,700	19,800	75,700	36,400	134,100	137,400	128,600	227,600
7.....	161,600	48,100	85,700	47,200	26,500	17,300	56,200	31,000	90,700	150,600	128,600	174,800
8.....	150,600	45,400	73,700	44,500	19,800	27,400	50,800	30,100	92,700	118,700	120,900	160,500
9.....	137,400	47,200	71,700	33,100	33,700	23,800	58,000	23,800	91,700	116,500	114,300	182,500
10.....	117,600	43,600	61,700	36,400	40,900	45,400	51,700	28,300	84,700	124,200	122,000	144,000
11.....	106,600	40,000	56,200	37,300	42,700	47,200	146,200	26,500	77,700	104,400	116,500	126,400
12.....	93,700	33,700	51,700	33,700	35,500	47,200	236,400	27,400	123,100	89,700	117,600	124,200
13.....	85,700	32,600	48,100	30,100	23,000	39,100	236,400	40,000	91,700	82,700	133,000	130,800
14.....	172,600	55,300	50,800	29,200	20,600	36,400	195,700	36,400	83,700	106,600	236,400	201,200
15.....	199,000	134,100	158,000	30,100	18,900	49,000	211,100	37,300	81,700	238,600	200,100	134,100
16.....	194,600	139,100	95,700	27,400	28,300	49,000	193,500	37,300	84,700	304,600	134,100	159,400
17.....	238,600	115,400	74,700	28,300	23,800	40,000	127,500	31,000	75,700	227,600	227,600	150,600
18.....	247,400	101,100	68,700	31,000	15,700	31,000	196,800	38,200	77,700	161,600	156,100	151,700
19.....	216,600	112,100	107,700	25,600	21,400	25,600	189,100	39,100	130,800	108,800	126,400	148,400
20.....	174,800	86,700	84,700	21,400	17,300	25,600	172,600	77,700	126,400	107,700	126,400	130,800
21.....	98,900	87,700	70,700	21,400	20,600	18,900	236,400	60,700	126,400	125,300	118,700	126,400
22.....	227,600	79,700	58,000	19,800	25,600	49,000	223,200	73,700	137,400	120,900	135,200	115,400
23.....	227,600	74,700	49,900	23,000	29,200	45,400	207,800	76,700	146,200	126,400	135,200	102,200
24.....	218,800	18,300	46,300	23,800	18,900	59,800	185,800	55,300	387,100	135,300	137,400	95,700
25.....	137,900	117,600	56,200	63,700	22,200	49,000	188,000	49,000	453,100	130,800	141,800	89,700
26.....	78,700	89,700	61,700	43,600	25,600	39,100	174,800	39,100	392,600	113,200	167,100	83,700
27.....	67,700	73,700	52,600	32,800	16,500	39,100	163,800	50,800	232,000	125,300	260,600	172,600
28.....	67,700	128,600	45,400	28,300	27,400	42,700	148,400	45,400	133,000	134,100	222,100	200,100
29.....	66,700	111,000	49,900	30,100	25,600	56,200	94,700	64,700	130,800	131,900	170,400	145,100
30.....	63,700	.....	46,300	48,100	13,300	63,700	102,200	69,700	133,000	117,600	146,200	126,400
31.....	59,800	.....	42,700	.....	11,700	.....	83,700	79,700	.....	109,900	.....	115,400
Maximum	260,600	189,100	155,000	79,700	42,700	63,700	255,100	79,700	453,100	304,600	447,600	227,600
Minimum	59,800	33,700	42,700	19,800	11,700	17,300	36,400	23,800	75,700	82,700	83,700	83,700
Mean	159,805	77,803	72,565	38,393	24,851	37,293	137,961	45,971	163,400	135,090	166,193	142,897



Daily and monthly discharges, in liters per second, of Aclan River near Poblacion, Malinao, Cuziz, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.	119,800	257,300	192,400	73,700	52,600	34,600	63,700	85,700	65,700	58,000	189,100	232,000
2.	211,100	227,600	117,600	74,700	50,800	95,700	83,700	90,700	74,700	69,700	277,100	208,900
3.	189,100	174,800	84,700	75,700	43,600	80,700	115,400	81,700	61,700	69,700	234,800	212,200
4.	148,400	136,300	76,700	74,700	39,100	46,300	156,100	84,700	61,700	95,700	268,000	227,600
5.	137,400	104,400	73,700	77,700	36,400	112,100	189,100	81,700	67,700	82,700	292,800	266,100
6.	126,400	137,400	68,900	75,700	40,000	75,700	150,600	126,400	81,700	67,700	273,800	292,500
7.	135,200	117,600	51,700	65,700	39,100	46,300	125,300	130,800	111,000	58,900	231,400	271,600
8.	134,100	104,400	79,700	68,700	40,900	64,700	117,600	105,500	76,700	68,700	305,400	258,400
9.	167,100	87,700	179,200	62,700	38,200	85,700	85,700	90,700	84,700	77,700	395,000	258,400
10.	227,600	73,700	186,800	58,000	40,900	49,000	68,700	74,700	15,500	77,700	395,000	258,400
11.	322,100	66,700	109,900	61,700	34,400	88,700	138,500	76,700	15,500	93,700	486,100	252,900
12.	183,800	54,500	115,400	57,100	35,500	80,700	163,800	86,700	42,100	102,200	376,100	260,600
13.	166,000	51,700	117,600	64,700	47,200	101,100	133,000	80,700	371,700	102,200	306,800	279,900
14.	152,800	92,700	135,200	55,200	42,700	117,600	111,000	80,700	262,800	102,200	205,600	386,500
15.	260,600	87,700	185,800	29,200	58,000	75,700	134,100	76,700	179,200	87,700	167,100	364,000
16.	185,800	95,700	182,500	38,200	58,900	51,700	156,100	67,700	163,800	113,200	144,000	290,300
17.	196,800	75,700	251,800	21,400	68,700	34,600	163,800	61,700	153,900	115,400	123,100	256,200
18.	101,100	101,100	287,000	31,900	101,100	60,700	218,800	57,100	134,100	108,800	104,400	279,300
19.	126,400	111,000	287,000	28,300	138,500	74,700	315,600	54,400	106,600	120,900	102,200	320,000
20.	104,400	127,500	255,100	68,700	115,400	92,700	331,600	52,600	87,700	119,800	105,500	416,800
21.	93,700	172,600	239,700	85,700	73,700	119,800	348,600	49,900	78,700	115,400	122,100	339,800
22.	83,700	272,700	129,700	85,700	68,700	177,300	320,000	37,700	48,000	108,800	236,400	339,800
23.	139,600	238,100	96,800	85,700	100,100	207,800	205,600	37,700	48,000	108,800	236,400	339,800
24.	121,500	336,800	75,700	65,700	100,100	207,800	205,600	37,700	48,000	108,800	236,400	339,800
25.	124,400	300,200	80,700	64,700	100,100	207,800	205,600	37,700	48,000	108,800	236,400	339,800
26.	108,800	288,100	84,700	74,700	86,700	152,800	147,300	31,000	36,400	116,500	438,600	254,000
27.	108,800	288,100	84,700	74,700	51,700	152,800	116,500	42,700	58,900	119,800	387,100	259,400
28.	126,400	260,600	84,700	78,700	37,300	100,000	100,000	44,500	63,700	136,300	405,800	312,300
29.	156,100	...	74,700	58,000	32,800	63,700	84,700	45,400	66,700	140,700	339,800	378,300
30.	238,600	...	71,700	58,000	39,100	53,500	94,700	62,700	69,700	142,900	310,100	362,900
31.	238,600	...	68,700	...	36,400	...	83,700	68,700	...	130,800	...	337,600
Maximum.	332,100	336,500	227,000	85,700	138,500	207,800	348,600	130,800	442,100	166,100	486,100	416,800
Minimum.	83,700	44,500	51,700	21,400	32,800	31,000	63,700	31,000	117,660	68,000	102,200	208,900
Mean.	157,784	159,871	123,384	62,013	56,958	90,587	157,194	70,735	117,660	102,903	270,353	289,165

Daily and monthly discharges, in liters per second, of Aclan River near Poblacion, Malinao, Capiz, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	283,700	241,900	147,300	129,700		105,500	134,100	156,100	84,700	125,300	130,800	134,100
2.....	287,000	250,700	145,100			102,200	124,200	137,400	85,700	120,900	116,500	141,800
3.....	257,300	243,000	140,700			105,500	134,100	141,800	90,700	114,300	147,300	120,900
4.....	260,600	250,700	136,300			108,800	180,300	118,700	82,700	120,900	{315,600}	131,900
5.....	269,400	251,800	134,100		73,700	113,200	196,800	115,400	79,700	115,400	{425,600}	332,100
6.....	252,900	258,400	126,400		74,700	105,500	145,100	126,400	80,700	104,400	334,300	332,100
7.....	260,600	248,500	111,000		79,700	102,200	120,900	119,800	79,700	97,800	260,600	277,100
8.....	241,900	241,900	104,400		77,700	94,700	119,800	109,900	86,700	97,800	189,100	337,600
9.....	258,300	246,300	117,600		78,700	94,700	133,000	111,000	87,700	104,400	194,600	230,400
10.....	258,400	250,700	128,600		79,700	90,700	{287,000}	108,800	81,700	108,800	150,600	225,400
11.....	263,900	245,200	140,700		75,700	91,700	{322,600}	103,800	86,700	119,800	147,300	194,600
12.....	273,800	245,200	174,800		73,700	91,700	145,100	108,800	88,700	114,300	147,300	150,600
13.....	284,800	204,500	201,200		77,700	95,700	136,300	105,500	83,700	119,800	136,300	190,200
14.....	271,600	174,800	197,900		73,700	95,700	119,800	109,900	89,700	107,700	122,000	217,700
15.....	155,600	155,000	195,700		73,700	86,700	130,800	113,200	104,400	109,900	205,600	215,500
16.....	251,800	139,600	204,500		71,700	81,700	150,600	122,000	156,100	144,060	145,100	188,000
17.....	243,000	131,900	200,100		76,700	79,700	180,300	117,600	288,100	178,100	108,800	145,100
18.....	208,900	125,300	195,700		74,700	77,700	159,400	112,100	{423,400}	150,600	109,900	167,100
19.....	208,900	134,100	183,600		73,700	76,700	182,500	122,000	{311,200}	182,500	102,200	172,600
20.....	207,800	142,900	175,900		73,700	80,700	196,800	116,500	206,700	182,500	102,200	172,600
21.....	221,000	149,500	162,700		205,600	82,700	181,400	101,100	196,800	172,600	116,500	222,100
22.....	232,000	174,800	155,000		251,100	87,700	184,700	105,500	194,600	131,000	123,000	277,100
23.....	281,000	213,300	151,700		241,600	96,800	158,300	107,700	192,400	130,800	122,000	238,600
24.....	280,300	188,000	148,400		227,600	107,700	150,600	104,400	166,000	118,700	118,700	304,500
25.....	250,500	169,300	130,800		178,700	108,800	184,700	102,200	165,400	112,100	124,000	398,100
26.....	250,500	169,300	130,800		178,700	108,800	184,700	102,200	165,400	112,100	124,000	398,100
27.....	252,900	161,500	146,200		138,600	130,800	163,300	88,700	116,500	116,500	181,600	218,800
28.....	256,200	155,000	153,900		123,100	130,800	150,600	82,700	120,900	161,600	189,100	131,900
29.....	254,000	149,500	149,500		112,100	118,700	128,600	84,700	120,900	150,600	130,800	128,600
30.....	250,700	139,600	139,600		108,800	142,900	120,900	80,700	120,900	150,600	150,600	128,600
31.....	239,700	131,900	131,900		105,500	142,900	148,400	83,700	120,900	178,100	150,600	115,400
Maximum	290,300	258,400	204,500		541,100	142,900	392,600	156,100	423,400	182,500	425,600	998,100
Minimum	207,800	125,300	104,400		71,700	76,700	119,800	81,700	79,700	97,800	102,200	97,800
Mean.....	255,831	198,332	154,681		157,077	100,000	163,232	110,621	131,367	129,913	160,720	213,300

NOTE.—No record on days for which discharge is not given.

## CAPIZ PROVINCE

## MAMBUSAO RIVER, MAMBUSAO

LOCATION.—About 4 km. southwest of the town of Mambusao and about 250 m. south of the Mambusao-Jagnaya Road under construction.

RECORDS AVAILABLE.—From June 15, 1919, to December 31, 1922.

GAGE.—Inclined staff of three sections anchored on left bank of river.

DISCHARGE MEASUREMENTS.—Made by wading at low water; from boat at high water at section 50 m. above gage.

CHANNEL AND BANKS.—Channel straight for 300 m. above and 50 m. below the station. Right bank high and covered with vegetation; left bank lowout and slightly subject to overflow, also covered with vegetation. At measuring section, stream bed is composed of hard cemented sandstones and, therefore, not shifting. Flow uniform.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 425,220 second-liters on November 4, 1922. Minimum discharge, 450 second-liters on August 27, 1919.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge determined from fairly well-defined curves. Gage read twice daily. Due to vegetal growth in channel, and occasional jamming of logs, some discharge measurements were considered in error.

*Discharge measurements of Mambusao River, near Tumulalud,  
Mambusao, Capiz*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1919</b>				
July 18 . . .	C. Daquill. . .	2 06	142,167	Unreliable measure- ment
July 24 . . .	do . . .	1 88	8,722	
August 29. . .	do . . .	1 18	796	
September 19. . .	do . . .	2 44	20,309	
September 19. . .	do . . .	2 09	11,799	
October 6 . . .	do . . .	1 34	1,657	
October 23 . . .	do . . .	1 98	8,556	
November 6. . .	do . . .	2 52	23,988	
December 18 . . .	do . . .	2 00	9,841	
<b>1920</b>				
January 9. . .	do . . .	2 55	28,355	
January 29. . .	do . . .	1 74	4,648	
February 9. . .	do . . .	1 54	2,719	
March 8. . .	do . . .	1 68	4,385	
April 19. . .	do . . .	1 35	902	
May 17. . .	do . . .	1 45	2,257	
June 19 . . .	T. Mendoza. . .	1 48	2,796	
July 6 . . .	C. Daquill. . .	1 70	4,979	
August 23 . . .	R. P. Ilagan. . .	1 39	2,006	
September 20. . .	T. Mendoza. . .	2 25	14,630	
December 10. . .	do . . .	2 71	26,061	
December 10. . .	do . . .	2 52	17,000	
<b>1921</b>				
February 11. . .	do . . .	1 68	6,203	
March 23. . .	do . . .	1 49	5,173	
June 9. . .	do . . .	2 24	7,450	
July 1. . .	do . . .	1 86	6,439	
August 19. . .	do . . .	1 48	3,174	
September 27. . .	do . . .	1 62	4,116	
October 25. . .	do . . .	2 33	7,147	
November 23. . .	do . . .	4 50	42,122	

*Discharge measurements of Mambusao River, near Tumulalud,  
Mambusao, Capiz—Continued*

Date	Made by—	Gage height (meters)	Discharge (second- liters)	Remarks
<b>1922</b>				
January 9. . . . .	T. Mendoza . . . . .	2 20	8,223	
February 15. . . . .	do . . . . .	1 56	3,400	
February 27. . . . .	do . . . . .	1 46	3,141	
March 14. . . . .	do . . . . .	1 69	5,018	
April 10. . . . .	do . . . . .	1 46	3,169	
May 9. . . . .	do . . . . .	1 86	8,127	
May 14. . . . .	do . . . . .	1 35	2,894	
June 14. . . . .	do . . . . .	1 80	6,675	
June 14. . . . .	do . . . . .	1 80	6,907	
June 28. . . . .	do . . . . .	2 82	48,781	
August 24. . . . .	do . . . . .	1 74	6,616	
September 29 . . . . .	do . . . . .	1 60	4,881	
October 28. . . . .	do . . . . .	2 23	11,498	
November 15 . . . . .	do . . . . .	2 78	37,834	
December 16 . . . . .	do . . . . .	2 25	19,427	

Daily and monthly discharges, in liters per second, of Mambusao River near Tumulalad, Mambusao, Capiz, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.							870	1,330	1,840	3,280	37,260	39,240
2.							1,760	1,140	1,540	2,500	63,540	42,480
3.							2,160	1,140	1,260	2,000	25,560	47,520
4.							1,600	1,200	1,140	1,540	33,840	57,960
5.							4,900	4,900	1,085	1,540	25,560	37,260
6.							18,180	2,090	2,500	7,300	23,220	98,880
7.							9,160	975	3,810	34,560	33,480	48,240
8.							3,700	3,080	1,920	49,320	21,240	21,420
9.							2,780	2,880	15,660	21,600	28,440	14,940
10.							5,680	2,000	8,520	23,040	16,200	15,120
11.							22,320	1,540	3,700	10,295	23,400	11,880
12.							10,120	1,830	4,160	8,200	14,940	18,320
13.							2,580	1,140	1,760	30,780	8,840	19,800
14.							4,640	1,030	13,680	44,280	7,800	7,900
15.						4,640	1,880	920	23,400	24,120	6,740	7,900
16.						3,080	2,000	820	36,180	16,920	7,900	9,480
17.						1,880	13,500	720	17,280	10,820	10,820	14,040
18.						2,000	4,900	670	11,170	11,520	14,040	14,040
19.						1,610	3,920	1,030	10,470	21,600	38,680	38,680
20.						2,320	1,770	1,680	10,470	18,480	15,480	15,480
21.						2,240	8,050	1,680	11,520	9,480	11,700	15,480
22.						1,840	1,820	570	5,940	8,840	12,240	13,860
23.						1,820	9,160	670	3,590	27,720	12,240	11,880
24.						1,030	7,450	570	3,590	27,720	12,240	11,880
25.						1,140	6,600	530	9,160	50,400	27,360	14,580
26.						1,330	3,920	450	6,200	39,960	15,480	16,560
27.						1,260	3,280	720	3,480	21,600	12,600	12,600
28.						1,610	3,080	720	3,700	18,360	39,960	12,600
29.						1,140	2,500	920	4,900	21,420	22,680	32,220
30.						1,140	1,840	2,320	4,900	41,580	35,280	35,280
31.						4,640	22,320	4,900	36,180	50,400	63,540	65,160
Maximum						820	450	920	8,320	19,324	22,630	24,616
Minimum						1,795	6,462	1,401	8,320	19,324	22,630	24,616
Mean						1,795	6,462	1,401	8,320	19,324	22,630	24,616

Daily and monthly discharges, in liters per second, of Mambusao River near Tumalad, Mambusao, Capiz, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	25,200	5,420	9,480	2,320	1,680	4,160	2,880	4,400	3,280	8,520	4,640	31,140
2	36,440	4,400	2,880	2,320	1,540	3,280	4,400	5,160	9,640	6,740	5,280	36,000
3	27,180	4,640	8,360	2,160	1,540	3,080	4,400	5,160	4,160	15,120	24,480	33,180
4	47,570	4,640	6,600	2,320	1,470	3,080	7,020	2,680	3,700	10,820	135,260	22,680
5	32,940	4,040	5,680	2,320	2,880	3,700	7,300	4,160	3,280	6,200	77,760	63,860
6	20,160	3,920	4,280	2,160	2,880	5,290	5,290	2,320	2,680	22,860	27,360	90,720
7	13,860	3,700	4,160	2,000	2,500	3,920	5,940	3,080	3,080	10,470	16,740	54,720
8	16,740	3,700	5,680	2,000	2,500	3,700	4,400	3,480	3,810	42,840	30,600	20,880
9	21,060	3,480	4,160	1,840	2,500	3,700	3,280	2,160	5,680	27,360	13,680	49,600
10	16,560	3,280	3,920	3,280	3,280	14,580	7,900	1,840	3,700	17,640	11,170	21,420
11	11,880	3,080	3,280	2,080	3,480	16,200	5,080	1,680	2,500	10,995	11,400	20,520
12	9,320	3,700	3,080	1,840	3,810	16,200	11,345	2,160	2,880	7,020	10,820	19,295
13	6,740	4,400	2,980	1,840	2,500	9,160	13,320	15,480	2,880	4,520	9,600	11,880
14	24,480	4,400	2,880	2,410	2,080	6,460	6,740	3,080	18,680	5,420	29,880	40,680
15	64,130	10,470	5,680	2,000	3,280	9,700	4,400	2,680	19,460	7,320	18,380	18,900
16	33,300	30,600	6,740	1,840	3,280	3,590	3,480	2,240	11,170	10,820	12,960	23,760
17	27,540	9,640	4,640	1,680	2,500	3,180	2,680	4,160	5,420	11,170	9,960	22,860
18	28,080	5,680	3,980	1,840	14,400	3,920	2,680	2,680	6,780	26,280	8,360	20,520
19	21,960	4,280	3,280	1,760	16,460	2,780	2,320	2,410	47,700	17,160	6,460	18,900
20	35,280	4,770	3,280	1,760	18,760	2,410	2,320	2,410	21,960	23,580	6,070	11,880
21	12,240	5,160	3,280	1,680	19,800	2,320	2,320	2,500	64,080	12,600	6,680	9,480
22	9,960	4,900	3,280	1,840	19,800	2,320	2,320	2,500	16,560	21,780	6,330	8,360
23	10,645	4,640	2,780	2,160	10,820	2,410	2,000	2,000	10,820	9,160	5,680	6,740
24	8,200	3,920	2,680	2,160	5,160	9,160	1,840	5,160	45,180	6,740	6,070	5,680
25	7,150	6,200	2,780	2,000	4,160	13,480	1,680	10,295	111,600	6,600	6,200	6,460
26	6,740	5,940	2,880	5,030	3,590	18,360	1,540	3,280	66,240	5,680	5,160	7,600
27	5,440	4,920	2,180	2,500	3,280	3,080	1,760	11,520	31,500	5,160	9,800	7,900
28	5,680	7,380	2,680	2,000	21,600	4,640	1,840	13,320	13,320	6,200	30,420	9,800
29	5,940	29,880	2,600	1,760	21,600	4,640	2,160	4,520	11,700	6,600	14,040	6,880
30	5,070	..	2,680	2,000	10,470	3,380	2,000	3,700	11,345	4,770	11,170	5,940
31	5,680	..	2,680	..	4,900	..	1,920	3,180	..	3,920	..	4,900
Maximum	64,130	30,600	9,480	5,030	21,600	18,360	13,320	15,480	111,600	42,840	135,260	90,720
Minimum	3,080	3,080	2,500	1,680	1,400	2,320	1,540	1,680	2,500	4,640	4,900	4,900
Mean	19,486	6,734	4,068	2,163	6,210	6,214	4,149	4,205	18,826	11,992	19,132	22,675

Daily and monthly discharges, in liters per second, of Mambusao River near Tumalalud, Mambusao, Capiz, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	4,900	39,600	10,820	3,520	2,480	11,830	13,150	38,420	11,730	4,330	12,064	9,163
2	47,160	18,000	8,680	4,020	2,480	7,900	6,550	11,040	18,410	24,440	30,132	8,160
3	34,200	34,920	6,740	3,450	2,370	26,560	6,760	7,440	27,375	9,600	31,848	27,060
4	15,840	17,100	5,940	3,120	2,260	2,360	4,905	10,145	22,950	6,870	12,786	12,786
5	13,500	11,520	4,900	4,020	2,870	6,130	4,195	5,540	11,200	5,540	64,472	13,496
6	10,820	8,360	4,640	5,350	2,370	26,830	4,170	3,945	20,810	4,250	100,065	27,496
7	10,470	8,050	5,680	3,180	2,260	21,040	4,820	6,340	15,680	4,250	100,065	15,512
8	12,960	8,520	5,160	2,880	2,560	17,450	4,820	4,410	17,440	4,250	30,036	11,300
9	13,680	6,886	27,000	2,760	2,560	16,530	4,490	6,760	6,550	20,120	110,900	9,560
10	13,000	6,800	16,320	2,700	2,260	16,590	18,620	6,235	8,150	16,590	157,116	8,560
11	22,500	3,380	4,320	4,490	2,425	18,410	27,100	6,250	238,100	33,380	70,640	7,576
12	14,220	4,400	4,250	3,520	2,315	6,980	31,820	3,590	104,100	9,720	25,300	7,392
13	16,200	4,160	18,410	2,110	2,315	11,510	12,655	3,380	13,660	8,150	16,700	12,288
14	15,120	10,120	25,500	2,370	2,315	18,200	7,745	3,180	18,150	7,095	11,952	21,216
15	26,640	5,680	45,750	2,060	2,760	8,525	5,730	3,060	10,000	96,060	10,360	29,372
16	18,360	4,520	32,750	2,260	2,820	5,730	4,410	2,940	7,210	125,316	10,360	18,560
17	11,880	3,920	60,875	2,260	2,560	10,435	17,095	2,700	6,340	11,952	10,360	18,560
18	7,600	29,160	53,100	2,260	1,435	18,200	17,095	2,700	6,340	11,952	10,360	18,560
19	7,350	40,320	26,930	2,180	1,435	12,130	17,725	3,130	5,080	11,952	10,360	18,560
20	7,350	40,320	26,930	2,180	1,435	12,130	17,725	3,130	5,080	11,952	10,360	18,560
21	8,050	54,000	6,550	2,266	2,560	10,230	5,730	4,820	6,030	22,464	8,160	18,632
22	8,050	54,000	6,550	2,266	2,560	10,230	5,730	4,820	6,030	22,464	8,160	18,632
23	6,740	62,640	5,445	4,410	10,000	12,965	4,820	4,990	7,785	15,628	17,540	17,180
24	6,740	62,640	5,445	4,410	10,000	12,965	4,820	4,990	7,785	15,628	17,540	17,180
25	6,880	50,040	4,650	3,310	5,830	28,500	4,930	6,250	6,340	13,076	39,436	16,940
26	6,880	50,040	4,650	3,310	5,830	28,500	4,930	6,250	6,340	13,076	39,436	16,940
27	6,320	38,520	4,410	2,820	3,730	15,650	4,820	3,310	17,790	10,364	23,620	21,216
28	7,020	26,280	4,820	2,820	4,020	9,325	11,200	3,120	11,200	18,404	146,728	82,832
29	33,480	15,480	4,170	2,700	4,735	16,590	13,150	4,095	7,265	22,472	22,472	182,636
30	33,480	15,480	3,870	2,645	3,480	16,590	13,150	4,095	7,265	22,472	22,472	182,636
31	33,480	15,480	3,870	2,645	3,480	16,590	13,150	4,095	7,265	22,472	22,472	182,636
Maximum	83,880	62,640	60,375	12,820	25,500	57,950	137,000	62,350	238,100	125,316	157,116	102,632
Minimum	4,900	3,380	3,450	2,060	2,210	5,730	4,170	2,700	5,080	3,660	8,160	7,392
Mean	19,515	19,779	15,167	3,318	4,955	17,697	13,534	8,437	21,593	21,705	37,471	19,308

NOTE.—Discharge determined from fairly well-defined rating curves, applicable as follows: March 13 to October 15, 1921, fair between 3,000 and 8,000 second-liters; October 16, 1921, to May 8, 1922, fair between 3,000 and 43,000 second-liters.

Daily and monthly discharges, in liters per second, of Mambusao River near Tumulad, Mambusao, Capiz, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	8,660	7,576	3,970	2,442	1,952	40,170	30,660	10,430	22,900	5,376	39,540	24,360
2	7,484	25,580	3,810	2,442	1,816	18,200	18,860	9,180	9,180	6,620	30,060	23,140
3	6,840	11,408	4,130	2,300	1,884	22,660	12,250	9,350	15,260	5,004	53,090	12,650
4	7,024	24,880	3,650	2,300	1,816	19,780	12,250	10,530	11,690	4,350	285,060	12,650
5	7,484	11,196	3,490	2,300	2,020	29,500	38,920	7,220	11,330	4,456	261,380	15,470
6	7,208	12,176	3,334	2,230	2,370	49,550	17,570	6,760	6,760	5,250	51,650	25,940
7	7,392	9,260	3,324	2,300	2,160	17,150	12,250	6,480	8,020	11,150	68,390	36,130
8	10,884	7,208	3,178	2,442	2,160	11,510	14,050	7,060	24,100	11,510	42,110	31,740
9	8,560	7,208	3,490	2,586	5,376	9,350	32,300	19,780	65,250	26,110	41,450	16,730
10	8,560	6,664	3,178	2,952	8,340	8,180	258,820	10,530	20,260	22,900	135,940	11,510
11	11,624	6,136	3,490	2,730	10,070	6,760	269,700	20,260	21,700	28,100	38,920	9,710
12	13,888	4,130	4,936	3,026	3,670	9,010	61,970	20,020	33,140	23,860	31,180	11,510
13	12,848	4,050	6,932	2,760	2,760	8,020	25,140	14,450	19,540	37,680	28,660	132,100
14	9,860	4,290	4,772	6,136	2,520	8,020	22,660	11,880	12,250	23,140	25,670	42,770
15	9,160	3,970	5,100	3,730	2,360	5,640	17,150	9,890	9,010	21,220	40,810	37,680
16	8,360	3,890	4,210	2,878	2,360	6,760	32,020	8,180	8,020	29,500	16,520	18,860
17	7,484	3,810	4,610	2,586	24,620	9,010	57,590	19,300	16,540	33,700	21,940	13,220
18	7,024	3,970	3,810	2,442	14,660	7,700	131,180	40,810	16,730	33,700	38,900	32,860
19	6,488	4,450	4,450	2,300	9,890	6,760	132,380	17,360	10,070	32,300	15,470	69,580
20	6,840	3,970	3,570	2,300	8,890	17,150	17,150	10,730	5,380	24,000	11,330	58,960
21	8,560	3,890	3,570	2,300	7,710	15,430	17,150	22,420	8,020	21,220	11,150	93,760
22	10,884	10,884	3,490	2,300	404,100	45,230	50,250	22,420	8,020	21,220	11,330	91,700
23	12,812	7,960	3,334	2,160	228,900	47,510	34,600	8,340	13,650	17,150	23,400	25,400
24	15,628	6,576	3,256	1,884	41,450	24,100	62,380	6,480	13,650	17,150	27,330	390,660
25	15,048	5,100	3,178	1,884	17,360	28,100	95,500	5,640	10,430	19,050	77,330	390,660
26	14,700	4,580	2,730	1,884	33,050	22,900	61,600	5,500	7,380	15,470	27,330	257,540
27	8,760	4,050	2,730	1,884	33,140	94,420	34,600	5,004	6,340	11,880	60,750	48,500
28	8,160	4,050	3,178	1,816	20,020	27,830	21,700	12,850	5,004	55,800	68,610	28,940
29	6,488	...	2,878	1,748	14,650	75,950	15,890	15,890	4,562	99,820	151,300	18,860
30	30,...	...	2,730	2,952	15,890	21,220	12,650	8,340	6,760	30,060	93,340	23,140
31	6,664	...	2,658	...	25,670	...	15,470	23,140	...	93,880	...	49,900
Maximum	15,628	25,580	6,932	6,136	404,100	94,420	422,660	40,810	65,250	99,820	425,220	390,660
Minimum	6,312	3,810	2,658	1,748	1,816	5,640	12,250	5,004	4,562	4,350	10,070	9,710
Mean	9,141	7,561	3,723	2,563	32,121	30,159	60,573	12,742	13,900	25,756	62,747	57,514

Note.—Discharge determined from fairly well-defined rating curve, applicable from May 9 to December 31, 1922. Records fair between 2,700 and 60,000 second-liters.



## CAVITE PROVINCE

### BIÑANG RIVER, CARMONA

**LOCATION.**—About 750 m. below junction of this river with Lantic creek at barrio Lantic and 2.22 km. south of Carmona.

**RECORDS AVAILABLE.**—September 13, 1919, to March 18, 1922.

**GAGE.**—Standard metric gage nailed in a vertical position to a post driven at right bank of river.

**DISCHARGE MEASUREMENTS.**—Made by wading at 42.10 m. below gage. On April 30, 1921 a 3.048 m. sharp-crested weir with complete end contractions was constructed.

**CHANNEL AND BANKS.**—Channel is straight for about 300 m. above and below the station. Both banks rocky, high and wooded, not subject to overflow. At measuring section stream bed composed of gravel and fine sand and shifting during floods.

**EXTREMES OF DISCHARGE.**—Maximum discharge during period of observation, 5,992 second-liters on August 15, 1922; minimum discharge, 30 second-liters on May 10–13, 1920.

**DIVERSIONS.**—Two above the station.

**REGULATION.**—None.

**UTILIZATION.**—For irrigation purposes.

**ACCURACY.**—Daily discharge determined from a fairly well-defined curve from 40 to 190 second-liters. Applicable from September 13 to December 31, 1920. Gage read twice daily. From April 30, 1921, to March, 1922, discharge determined by weir formula,  $Q=1838 (L-.2H) H^{3/2}$  except on days when weir was overtopped, in which case discharge current meter rating table was applied.

*Discharge measurements of Biñang River, near Lantic, Carmona, Cavite*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1919</b>				
September 13.....	J. S. Roxas.....	.62	405	
September 13.....	do.....	.62	536	
<b>1920</b>				
February 21.....	do.....	.51	74	
April 27.....	J. Roxas and R. Pertierra	.43	41	
April 28.....	do.....	.43	60	
April 28.....	do.....	.43	52	
May 8.....	J. S. Roxas.....	.43	40	
May 10.....	do.....	.43	51	
June 30.....	do.....	.51	194	
July 1.....	do.....	.49	151	
July 1.....	do.....	.51	193	
July 2.....	J. S. Roxas and O. Buenaventura.	.46	104	
July 3.....	do.....	.48	115	
August 28.....	J. S. Roxas and A. Fegarido	.55	301	
August 28.....	do.....	.56	302	
September 9.....	A. Fegarido and B. Ramos.	.61	526	
September 24.....	B. Ramos.....	.76	950	
September 25.....	do.....	.73	885	

*Discharge measurements of Biñang River, near Lantic, Carmona,  
Cavite—Continued*

Date	Made by—	Gage height (meters)	Discharge (second- liters)	Remarks
<b>1921</b>				
January 26	Roxas and Castillo . . . .	.50	195	.....
February 23.	Castillo . . . . .	.45	69	.....
March 29	J. S. Roxas	.45	93	.....
April 12. . . . .	do . . . . .	.42	69	.....
<b>1922</b>				
May 9 .	do . . . . .	.75	64	.....
June 16. .	do. . . . .	.70	155	.....
July 4 .	do. . . . .	.71	164	.....
October 21 .	do . . . . .	.31	186	.....
November 23 .	do. . . . .	.32	188	.....
November 24 .	do . . . . .	.31	178	.....

Daily and monthly discharges, in liters per second, of Biñang River near Lantac, Carmona, Cavite, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.	..	..	..	..	..	..	..	..	..	132	286	340
2.	..	..	..	..	..	..	..	..	..	132	262	286
3.	..	..	..	..	..	..	..	..	..	132	215	238
4.	..	..	..	..	..	..	..	..	..	151	238	262
5.	..	..	..	..	..	..	..	..	..	132	238	238
6.	..	..	..	..	..	..	..	..	..	132	238	215
7.	..	..	..	..	..	..	..	..	..	151	238	238
8.	..	..	..	..	..	..	..	..	..	151	238	238
9.	..	..	..	..	..	..	..	..	..	151	238	238
10.	..	..	..	..	..	..	..	..	..	151	238	238
11.	..	..	..	..	..	..	..	..	..	132	262	238
12.	..	..	..	..	..	..	..	..	..	172	313	193
13.	..	..	..	..	..	..	..	..	490	193	340	172
14.	..	..	..	..	..	..	..	..	523	193	313	193
15.	..	..	..	..	..	..	..	..	523	805	340	193
16.	..	..	..	..	..	..	..	..	658	459	313	193
17.	..	..	..	..	..	..	..	..	589	262	340	172
18.	..	..	..	..	..	..	..	..	523	238	397	313
19.	..	..	..	..	..	..	..	..	490	238	397	428
20.	..	..	..	..	..	..	..	..	490	238	397	428
21.	..	..	..	..	..	..	..	..	459	459	340	428
22.	..	..	..	..	..	..	..	..	428	238	368	313
23.	..	..	..	..	..	..	..	..	397	238	368	313
24.	..	..	..	..	..	..	..	..	340	262	340	215
25.	..	..	..	..	..	..	..	..	215	238	340	215
26.	..	..	..	..	..	..	..	..	151	262	151	172
27.	..	..	..	..	..	..	..	..	151	523	172	132
28.	..	..	..	..	..	..	..	..	132	368	172	132
29.	..	..	..	..	..	..	..	..	151	238	193	151
30.	..	..	..	..	..	..	..	..	132	262	523	113
31.	..	..	..	..	..	..	..	..	132	368	..	113
Maximum..	..	..	..	..	..	..	..	..	1,012	805	523	428
Minimum..	..	..	..	..	..	..	..	..	132	132	151	113
Mean.....	..	..	..	..	..	..	..	..	407	270	289	247

Note.—Discharge determined from fairly well-defined rating curve.

Daily and monthly discharges, in liters per second, of Biñang River near Lantic, Carmona, Cavite, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	113	95	95	95	45	78	340	340	397	490	151	95
2.....	113	95	95	95	61	61	313	368	4,012	555	78	132
3.....	113	95	95	95	61	61	95	340	1,292	589	78	132
4.....	95	61	95	78	61	78	151	368	1,504	730	95	132
5.....	95	61	95	78	61	132	132	340	1,527	428	113	262
6.....	95	61	95	78	61	132	113	313	589	397	132	1,198
7.....	95	61	95	78	61	132	1,198	313	368	556	95	428
8.....	95	61	95	78	61	132	428	313	1,292	490	61	368
9.....	95	61	95	78	45	95	215	238	490	556	61	428
10.....	113	61	95	78	30	95	172	238	556	428	45	428
11.....	132	61	95	78	30	132	313	215	397	368	45	340
12.....	132	45	95	78	30	132	313	215	313	313	61	286
13.....	132	61	95	78	30	132	490	215	313	262	95	262
14.....	151	45	95	78	313	172	286	215	340	313	193	313
15.....	151	45	95	78	61	151	589	262	313	368	368	428
16.....	151	95	95	78	45	151	623	215	313	490	397	428
17.....	172	95	95	78	428	132	1,198	215	313	556	262	368
18.....	172	61	95	45	368	132	1,433	238	368	490	262	313
19.....	151	95	95	45	61	132	1,762	238	1,198	439	172	172
20.....	151	78	95	45	61	95	968	238	368	490	132	172
21.....	132	193	95	45	95	95	428	238	368	490	95	151
22.....	151	193	95	45	61	61	428	238	368	490	95	151
23.....	132	193	95	45	61	589	313	215	1,574	262	95	172
24.....	151	172	95	45	61	589	313	215	1,480	262	95	172
25.....	113	172	95	45	61	113	368	215	968	215	61	368
26.....	113	172	95	45	61	113	368	397	885	215	95	556
27.....	113	172	95	45	61	132	1,668	340	523	215	172	428
28.....	132	132	95	45	61	132	968	313	556	215	151	523
29.....	95	132	95	45	61	215	523	313	490	215	132	556
30.....	95	.....	95	61	95	.....	313	313	.....	215	.....	556
31.....	95	.....	95	61	95	.....	313	313	.....	215	.....	556
Maximum.....	172	193	95	95	428	523	1,762	397	4,012	730	397	1,198
Minimum.....	95	45	95	45	30	61	95	215	813	215	45	95
Mean.....	123	101	95	66	88	134	626	273	813	409	141	341

Note.—Discharge determined from fairly well-defined rating curve. Daily discharge for March, very unreliable.

Daily and monthly discharges, in liters per second, of Biñang River near Lantic, Carmona, Cavite, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	459	172	132	78	83	166	89	118	195	138	92	668
2	151	151	61	78	83	101	116	118	195	147	92	647
3	132	193	132	78	83	101	116	118	179	147	92	412
4	151	238	151	61	83	101	116	118	179	145	92	422
5	132	262	151	78	83	118	106	118	164	147	92	450
6	151	215	61	78	94	118	259	128	166	147	94	532
7	132	172	95	78	83	154	157	126	154	140	96	384
8	113	172	95	78	83	154	157	126	154	140	96	388
9	113	172	95	78	83	154	157	126	154	140	96	388
10	113	172	95	78	83	154	157	126	154	140	96	388
11	113	172	95	78	83	154	157	126	154	140	96	388
12	113	172	95	78	83	154	157	126	154	140	96	388
13	113	172	95	78	83	154	157	126	154	140	96	388
14	113	172	95	78	83	154	157	126	154	140	96	388
15	113	172	95	78	83	154	157	126	154	140	96	388
16	238	30	78	30	83	142	118	176	161	133	832	133
17	215	30	78	30	83	142	118	176	161	133	832	133
18	172	30	78	30	83	142	118	176	161	133	832	133
19	172	30	78	30	83	142	118	176	161	133	832	133
20	151	30	78	30	83	142	118	176	161	133	832	133
21	172	30	78	30	83	142	118	176	161	133	832	133
22	172	30	78	30	83	142	118	176	161	133	832	133
23	172	30	78	30	83	142	118	176	161	133	832	133
24	172	30	78	30	83	142	118	176	161	133	832	133
25	172	30	78	30	83	142	118	176	161	133	832	133
26	151	78	61	45	98	110	116	152	128	92	1,714	107
27	172	61	61	45	98	110	116	152	128	92	1,714	107
28	151	61	61	45	98	110	116	152	128	92	1,714	107
29	172	61	61	45	98	110	116	152	128	92	1,714	107
30	172	61	61	45	98	110	116	152	128	92	1,714	107
31	172	61	61	45	98	110	116	152	128	92	1,714	107
Maximum	459	262	151	95	214	401	259	5,992	195	147	5,767	668
Minimum	113	39	61	30	83	89	89	118	128	90	92	94
Mean	162	97	85	54	106	153	128	1,092	145	126	666	219

NOTE.—Discharge from January 1 to April 28, and on July 4, August 15-16, 18-20, 28, 30-31, 1921, determined from fairly well defined rating curve. For other days by weir formula,  $Q = 1,838 (L - .2 H)^{3/2}$ . \* Unreliable.

*Daily and monthly discharges, in liters per second, of Biñang River near Lantic, Carmona, Cavite, for the year 1922*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.	114	87	70	..	..	..	..	..	..	..	..	..
2.	116	79	70	..	..	..	..	..	..	..	..	..
3.	133	76	101	..	..	..	..	..	..	..	..	..
4.	109	79	94	..	..	..	..	..	..	..	..	..
5.	112	83	87	..	..	..	..	..	..	..	..	..
6.	107	74	83	..	..	..	..	..	..	..	..	..
7.	107	74	79	..	..	..	..	..	..	..	..	..
8.	107	79	74	..	..	..	..	..	..	..	..	..
9.	105	83	76	..	..	..	..	..	..	..	..	..
10.	131	85	74	..	..	..	..	..	..	..	..	..
11.	166	85	74	..	..	..	..	..	..	..	..	..
12.	131	79	72	..	..	..	..	..	..	..	..	..
13.	176	74	74	..	..	..	..	..	..	..	..	..
14.	179	72	74	..	..	..	..	..	..	..	..	..
15.	130	74	72	..	..	..	..	..	..	..	..	..
16.	128	74	72	..	..	..	..	..	..	..	..	..
17.	154	72	74	..	..	..	..	..	..	..	..	..
18.	138	63	72	..	..	..	..	..	..	..	..	..
19.	105	79	..	..	..	..	..	..	..	..	..	..
20.	101	79	..	..	..	..	..	..	..	..	..	..
21.	128	79	..	..	..	..	..	..	..	..	..	..
22.	157	81	..	..	..	..	..	..	..	..	..	..
23.	138	85	..	..	..	..	..	..	..	..	..	..
24.	142	83	..	..	..	..	..	..	..	..	..	..
25.	138	81	..	..	..	..	..	..	..	..	..	..
26.	118	79	..	..	..	..	..	..	..	..	..	..
27.	109	70	..	..	..	..	..	..	..	..	..	..
28.	147	70	..	..	..	..	..	..	..	..	..	..
29.	118	..	..	..	..	..	..	..	..	..	..	..
30.	109	..	..	..	..	..	..	..	..	..	..	..
31.	83	..	..	..	..	..	..	..	..	..	..	..
Maximum	181	87	101	..	..	..	..	..	..	..	..	..
Minimum	83	63	70	..	..	..	..	..	..	..	..	..
Mean	130	78	77	..	..	..	..	..	..	..	..	..

NOTE.—Discharge determined by weir formula,  $Q = 1.838 (L - .2 H) H^2$ .

## CAVITE PROVINCE

## KAY ALEMANG RIVER, NAIC

**LOCATION.**—At Sixto Velasco's dam, about 1.5 km. northeast of km. 5 of the Naic-Indang Road, and about 1.5 km. below the junction of this river with Sahing Creek.

**RECORDS AVAILABLE.**—From September 29, 1918, to March 31, 1922.

**GAGE.**—Standard gage board set vertically on wall at left abutment of dam.

**DISCHARGE MEASUREMENTS.**—Made by a sharp-crested weir with end contractions, is set at about 4 m. below the gage, and by wading when weir was overtopped and after said weir was abandoned.

**CHANNEL AND BANKS.**—Both the right and left banks are rocky, about 3 m. above ordinary water surface elevation. Stream bed at weir partly rocky and partly clayey.

**EXTREMES OF DISCHARGE.**—Maximum discharge during period of observation, 37,404 second-liters, on July 29, 1919; minimum discharge, 84 second-liters on December 20–22, 1918.

**DIVERSIONS.**—Water diverted for operation of Mr. Velasco's mill.

**REGULATION.**—By diversion above station.

**UTILIZATION.**—For power purposes.

**ACCURACY.**—From November, 1918, to March, 1919, discharge records largely estimated. During this period the mill is in operation and the greater part of the water is utilized. Gage read twice daily.

*Discharge measurements of Kay Alemang River, near Halang, Naic, Cavite*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1918</b>				
September 28. . . . .	A. Diaz. . . . .	.61	364	. . . . .
October 28 . . . . .	do . . . . .	.61	364	. . . . .
November 13. . . . .	do. . . . .	.60	354	. . . . .
<b>1919</b>				
March 29. . . . .	J. Roxas . . . . .	1.06	397	. . . . .
March 30. . . . .	do . . . . .	.93	261	. . . . .
April 16 . . . . .	do. . . . .	.96	252	. . . . .
<b>1921</b>				
July 13 . . . . .	do. . . . .	1.49	389	. . . . .
August 29 . . . . .	do. . . . .	1.40	1,062	. . . . .
August 30. . . . .	do . . . . .	1.45	1,214	. . . . .
September 2. . . . .	do . . . . .	1.56	2,004	. . . . .
October 29 . . . . .	do. . . . .	1.18	238	. . . . .
November 2. . . . .	do. . . . .	1.14	209	. . . . .
December 18 . . . . .	do. . . . .	1.27	298	. . . . .
March 25. . . . .	do. . . . .	1.18	270	. . . . .
May 23. . . . .	do . . . . .	1.44	1,060	. . . . .
July 10. . . . .	do. . . . .	1.41	872	. . . . .
August 8. . . . .	do. . . . .	1.34	760	. . . . .
August 12. . . . .	do. . . . .	1.28	508	. . . . .
October 8. . . . .	do. . . . .	1.37	1,686	. . . . .
October 9. . . . .	do. . . . .	1.37	1,603	. . . . .

NOTE.—Gage height from March 29, 1919, referred to a different datum.

*Daily and monthly discharges, in liters per second, of Kay Alemang River near Saling, Naic, Cavite, for the year 1918*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	185	255	185
2.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	185	255	185
3.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	185	255	185
4.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	185	255	185
5.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	185	255	185
6.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	185	255	185
7.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	185	255	185
8.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	185	255	185
9.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	185	255	185
10.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,380	255	185
11.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,380	255	185
12.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	185	185	185
13.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	185	185	185
14.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	185	185	185
15.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	600	185	185
16.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,380	185	125
17.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,660	185	125
18.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,580	185	125
19.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,380	185	125
20.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,380	185	84
21.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,660	185	84
22.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,660	185	185
23.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,380	185	185
24.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,380	185	185
25.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	600	185	295
26.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	600	185	375
27.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	600	185	375
28.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	185	185	375
29.....	.....	.....	.....	.....	.....	.....	.....	.....	185	415	185	355
30.....	.....	.....	.....	.....	.....	.....	.....	.....	185	415	185	295
31.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	415	.....	295
Maximum.....	.....	.....	.....	.....	.....	.....	.....	.....	185	2,660	255	375
Minimum.....	.....	.....	.....	.....	.....	.....	.....	.....	185	185	185	84
Mean.....	.....	.....	.....	.....	.....	.....	.....	.....	185	822	208	200



Daily and monthly discharges, in liters per second, of Kay Alemang River near Sahing, Naic, Cavite, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	295	415	1,080	255	255	503	347	4,124	9,484	470	429	429
2.....	295	415	1,080	255	295	503	5,244	3,964	7,004	516	429	429
3.....	295	575	1,510	375	295	503	22,764	928	3,884	516	429	347
4.....	295	575	1,510	375	295	375	2,884	3,324	1,934	516	516	347
5.....	295	457	1,575	295	295	255	2,524	11,324	1,796	1,526	429	387
6.....	355	457	1,575	295	295	255	516	10,684	2,224	1,526	429	387
7.....	355	457	1,575	295	295	255	516	18,604	2,151	1,398	470	470
8.....	355	457	1,710	295	295	255	470	10,844	1,398	516	429	429
9.....	355	745	1,710	295	295	295	347	8,134	2,681	516	429	429
10.....	355	745	1,710	295	295	12,020	347	17,644	1,458	2,354	470	429
11.....	355	745	1,710	295	375	347	347	32,684	1,526	1,697	387	347
12.....	355	457	850	375	375	347	387	20,924	1,526	565	429	347
13.....	295	457	850	295	375	429	429	7,804	1,526	617	470	387
14.....	215	850	850	295	375	429	429	6,204	1,401	3,154	429	429
15.....	170	850	850	295	457	457	387	10,844	1,398	1,398	429	387
16.....	170	850	850	295	457	457	387	6,124	1,371	1,808	516	347
17.....	170	850	850	295	375	375	347	4,764	1,526	617	808	387
18.....	215	1,080	1,080	295	375	1,869	347	3,154	1,218	516	2,151	387
19.....	295	1,080	1,380	295	375	516	429	6,384	1,038	516	617	307
20.....	295	1,195	375	295	375	470	347	5,884	1,038	516	516	307
21.....	295	1,195	375	295	375	470	347	3,584	1,038	516	516	307
22.....	295	1,080	375	295	375	470	1,796	3,584	868	516	429	307
23.....	295	1,080	375	295	375	516	1,401	3,154	710	516	516	307
24.....	295	1,080	375	295	375	516	1,868	13,154	660	516	429	347
25.....	295	850	375	295	375	516	470	17,884	516	516	429	307
26.....	375	850	295	295	375	565	5,084	10,764	516	565	516	307
27.....	375	850	457	295	375	516	14,204	4,204	470	516	429	347
28.....	375	970	457	295	375	516	37,404	3,324	516	516	429	347
29.....	415	...	375	255	375	516	9,724	9,724	516	516	429	347
30.....	415	...	255	255	375	516	9,724	9,724	516	516	429	347
31.....	415	...	255	...	503	...	37,404	5,164	...	516	...	347
Maximum.....	415	1,195	1,710	375	503	12,020	37,404	32,684	9,484	3,154	2,151	470
Minimum.....	170	415	255	255	255	255	347	928	470	470	387	307
Mean.....	311	774	929	298	360	1,080	3,942	8,895	1,851	789	525	368

NOTE.—Gage damaged on dates for which discharge is not given.

Daily and monthly discharges, in liters per second, of Kay Alemany River near Sahing, Naic, Cavite, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	347	307	267	194	230	267	517	428	9,564	1,155	428	428
2	347	267	267	194	194	267	517	517	10,684	5,564	428	517
3	347	267	267	230	347	347	471	517	4,604	1,869	565	428
4	347	267	267	230	307	428	6,524	615	6,524	1,040	1,040	347
5	347	267	267	230	347	517	517	517	13,884	1,155	1,155	428
6	347	267	267	194	307	517	517	428	3,324	810	810	517
7	347	307	267	194	347	517	565	428	3,324	1,278	516	471
8	347	267	267	194	347	428	565	428	2,524	1,155	428	1,411
9	347	307	267	194	347	347	565	428	1,661	1,155	428	1,411
10	307	267	267	194	347	347	615	387	1,040	565	428	517
11	307	267	267	194	347	347	517	347	1,710	615	428	347
12	347	267	267	194	347	307	5,244	428	615	615	347	347
13	347	267	267	194	307	428	6,444	387	810	615	428	347
14	307	267	267	194	347	307	2,011	347	710	660	1,155	347
15	347	307	267	194	267	428	710	868	615	660	1,155	307
16	347	267	267	194	347	428	1,661	988	517	471	1,040	428
17	347	267	267	194	347	428	1,278	988	517	4,764	615	347
18	347	267	267	194	347	267	4,764	988	988	3,324	517	347
19	347	267	267	194	267	347	3,651	810	615	1,155	428	347
20	347	267	267	230	267	267	2,095	710	810	1,155	347	347
21	347	267	267	249	267	267	1,796	615	810	710	347	347
22	347	267	267	267	267	517	1,216	928	517	517	267	347
23	347	267	267	267	267	387	785	710	4,604	347	267	347
24	347	267	267	267	267	347	565	517	3,154	347	267	347
25	347	267	230	267	267	347	517	810	3,154	387	347	347
26	347	267	194	267	307	347	2,834	1,040	2,151	387	307	347
27	347	267	194	267	267	428	2,374	1,040	2,151	387	347	347
28	307	267	194	230	267	428	1,528	988	928	347	347	347
29	307	267	194	230	267	615	1,468	810	660	428	307	307
30	347	267	194	194	267	660	1,868	1,040	428	347	347	347
31	307	...	194	194	267	660	516	1,155	428	347	...	307
Maximum	347	307	267	287	347	660	6,444	1,155	13,884	5,564	1,155	1,411
Minimum	307	267	194	194	194	267	471	347	428	347	267	267
Mean	338	272	252	220	303	392	1,554	684	2,794	1,075	530	440

Daily and monthly discharges, in liters per second, of Kay Alemang River near Saking, Naic, Cavite, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	347	194		192	270	270	358	751	2,913	1,693	270	1,346
2.....	347	194	138	154	250	270	313	718	1,815	1,455	230	1,455
3.....	347	194	138	154	250	270	313	718	1,815	1,455	230	1,455
4.....	347	194	138	154	250	270	313	718	1,815	1,455	230	1,455
5.....	347	194	138	154	250	270	313	718	1,815	1,455	230	1,455
6.....	347	194	138	154	250	270	313	718	1,815	1,455	230	1,455
7.....	347	194	138	154	250	270	313	718	1,815	1,455	230	1,455
8.....	347	194	138	154	250	270	313	718	1,815	1,455	230	1,455
9.....	347	194	138	154	250	270	313	718	1,815	1,455	230	1,455
10.....	347	194	138	154	250	270	313	718	1,815	1,455	230	1,455
11.....	347	194	138	154	250	270	313	718	1,815	1,455	230	1,455
12.....	347	194	138	154	250	270	313	718	1,815	1,455	230	1,455
13.....	267	230	508	192	192	270	1,346	2,303	1,060	508	10,477	430
14.....	307	194	508	192	192	270	1,245	3,523	1,245	405	7,183	358
15.....	307	194	508	192	192	270	623	9,135	976	381	686	335
16.....	267	194	508	192	230	313	358	5,353	751	358	3,157	405
17.....	267	194	508	192	230	313	1,150	1,571	686	335	1,554	405
18.....	267	194	508	192	230	313	1,150	1,571	686	335	1,554	405
19.....	267	194	508	192	230	313	1,150	1,571	686	335	1,554	405
20.....	267	194	508	192	230	313	1,150	1,571	686	335	1,554	405
21.....	267	194	508	192	230	313	1,150	1,571	686	335	1,554	405
22.....	267	230	270	250	230	313	1,571	1,455	731	270	508	508
23.....	267	230	270	250	230	313	1,571	1,455	731	270	508	508
24.....	267	230	270	250	230	313	1,571	1,455	731	270	508	508
25.....	267	230	270	250	230	313	1,571	1,455	731	270	508	508
26.....	267	230	270	250	230	313	1,571	1,455	731	270	508	508
27.....	267	230	270	250	230	313	1,571	1,455	731	270	508	508
28.....	267	230	270	250	230	313	1,571	1,455	731	270	508	508
29.....	267	230	270	250	230	313	1,571	1,455	731	270	508	508
30.....	267	230	270	250	230	313	1,571	1,455	731	270	508	508
31.....	194	194	270	270	313	405	821	1,346	1,245	313	.....	270
Maximum	353	1,155	564	508	313	405	2,303	9,135	2,913	1,693	33,413	1,876
Minimum	194	194	138	154	192	230	313	686	623	270	33,413	270
Mean	281	254	434	234	255	291	1,171	2,307	1,087	547	2,636	617

NOTE.—Discharge determined as follows: January 1 to August 29, 1921, by weir formula, 1,838 (L — .2 H) H<sup>3/2</sup>. August 30, 1921 to March 31, 1922, from current meter discharge rating curve. No record on days for which discharge is not given.

*Daily and monthly discharges, in liters per second, of Kay Alemang River near Saking, Naic, Cavite, for the year 1922*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.	358	230	192									
2.	381	530	192									
3.	381	192	192									
4.	405	230	192									
5.	455	230	192									
6.	455	192	211									
7.	481	230	192									
8.	481	192	192									
9.	455	230	211									
10.	455	270	192									
11.	381	192	192									
12.	335	211	230									
13.	405	192	192									
14.	358	211	192									
15.	358	230	211									
16.	358	192	230									
17.	335	230	192									
18.	335	192	192									
19.	313	192	192									
20.	313	230	192									
21.	313	192	192									
22.	335	230	192									
23.	270	192	230									
24.	270	192	211									
25.	313	230	230									
26.	313	192	230									
27.	358	192	230									
28.	270	192	230									
29.	230	192	230									
30.	211	230	230									
31.	230	230	230									
Maximum.	481	270	230									
Minimum.	211	192	192									
Mean.	349	211	207									

NOTE.—See footnote to discharge table for 1921.

## CAVITE PROVINCE

## LANTIC CREEK, CARMONA

**LOCATION.**—About 250 m. from the Gogo Dam and about 60 m. below the junction of Main Irrigation Canal with the Creek.

**RECORDS AVAILABLE.**—From June 20, 1921, to March 31, 1922.

**GAGE.**—Metric gage board vertically fastened to a tree on the right bank of the river.

**DISCHARGE MEASUREMENTS.**—Made by 3.048 m. sharp-crested weir with complete end contractions immediately below the gage.

**CHANNEL AND BANKS.**—Channel straight for 11 m. above the weir. Bed of river of adobe stone. Both banks high sloping gradually, of earthy texture and covered with vegetation.

**EXTREMES OF DISCHARGE.**—Maximum discharge recorded during period of observation, 9,149 second-liters on August 6, 1921, which discharge is only roughly estimated; minimum discharge, 42 second-liters on August 18-21, 1921.

**DIVERSIONS.**—Part of the flow diverted above the station.

**REGULATION.**—Only by diversion.

**UTILIZATION.**—For irrigation purposes.

**ACCURACY.**—Gage read once daily. Records fair.

*Daily and monthly discharges, in liters per second, of Lantic Creek near Lantic, Carmona, Cavite, for the year 1921*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.							80	83	248	154	87	44
2.							80	83	186	146	87	44
3.							83	83	170	132	87	44
4.							1,328	83	161	130	87	44
5.							176	83	277	100	87	44
6.							128	9,149	228	98	87	44
7.							105	710	170	98	87	89
8.							89	176	166	98	87	89
9.							91	152	152	96	109	89
10.							87	173	170	107	111	89
11.							83	146	259	105	197	89
12.							83	161	152	100	183	89
13.							83	189	146	91	168	84
14.							87	200	142	89	168	88
15.							87	405	192	89	168	98
16.							87	400	192	89	168	98
17.							87	100	107	89	130	98
18.							87	42	98	100	111	98
19.							87	42	100	100	111	98
20.							87	42	91	100	109	94
21.							87	42	89	100	111	94
22.							83	116	96	100	128	94
23.							128	203	113	91	146	91
24.							164	189	111	91	146	91
25.							83	170	100	91	142	91
26.							152	116	96	91	3,712	91
27.							118	122	170	91	44	91
28.							80	236	118	89	44	89
29.							80	225	122	87	44	89
30.							80	265	132	87	44	89
31.							113	250	..	87	..	89
Maximum						94	1,328	9,149	277	154	3,712	98
Minimum						78	80	42	89	87	44	44
Mean						82	142	315	148	101	233	83

NOTE.— Discharge determined by weir formula,  $Q = 1.838 (L - .2H) H^2$ .

Daily and monthly discharges, in liters per second, of Lantic Creek near Lantic, Carmona, Cavite, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.	87	74	74									
2.	87	74	74									
3.	87	74	74									
4.	87	74	74									
5.	87	74	74									
6.	87	74	74									
7.	87	74	74									
8.	83	74	76									
9.	83	74	79									
10.	83	74	79									
11.	83	74	79									
12.	83	74	79									
13.	83	74	79									
14.	83	74	79									
15.	83	74	79									
16.	83	74	79									
17.	83	74	79									
18.	83	74	79									
19.	83	74	79									
20.	83	74	79									
21.	79	74	79									
22.	79	74	79									
23.	79	74	79									
24.	74	74	79									
25.	74	74	79									
26.	74	74	79									
27.	74	74	79									
28.	74	74	79									
29.	74	74	79									
30.	74	74	79									
31.	74	74	79									
Maximum	87	74	79									
Minimum	74	74	74									
Mean	81	74	78									

NOTE.—See footnote to daily discharge table for 1921. Discharge in February, unreliable.

## CAVITE PROVINCE

## MARAGONDON RIVER, CAY-ACLE, MARAGONDON

LOCATION.—At sitio Cay-acle about 1.75 km. southeast of the barrio of Mabaccao and about 2.5 km. above junction of Balaungan river with the Maragondon.

RECORDS AVAILABLE.—From November 8, 1919, to December 31, 1922.

GAGE.—Standard metric gage board set vertically to rock on right bank of river.

DISCHARGE MEASUREMENTS.—Made from temporary bridge 8 m. above gage.

CHANNEL AND BANKS.—Channel only one at all stages; straight for 100 m. above and 130 m. below the gaging station. Banks rocky, steep and high, covered with trees, bamboos and vegetation and not subject to overflow. Stream bed slightly, shifting, watershed precipitous, and a little rainfall causes immediate rise of water which subsides immediately after.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 2,188,000 second-liters on August 16, 1921; minimum discharge, 820 second-liters on May 31–June 2, 1924.

DIVERSIONS.—One below the station.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge determined from poorly defined curves. The station is a poor one. Gage read twice daily. Due to occasional jamming of logs and trees during rainy season and the irregularities of stream bed, good current meter measurements can hardly be made.

*Discharge measurements of Maragondon River near Mabaccao,  
Maragondon, Cavite*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1919</b>				
November 7....	J. S. Roxas..	1 46	2,893	
November 8....	... do...	1.46	3,159	
<b>1920</b>				
January 15....	do..	1 34	1,927	
February 29....	do..	2 40	1,599	
March 1....	do..	2 40	1,693	
April 30....	do..	1 28	1,495	
May 25....	do..	2 48	9,315	
June 18....	do..	1 33	1,524	
June 18....	do..	1 33	1,531	
August 25....	do..	1 57	3,068	
October 25....	do..	1 43	3,455	
October 26....	do..	1 44	3,433	
November 24....	do..	1.35	2,325	
<b>1921</b>				
January 6....	do..	1.27	1,811	
January 7....	do..	1.27	1,833	
February 23....	do..	2.25	1,915	
March 24....	do..	1.98	1,217	
April 14....	do..	2.28	1,240	
July 11....	do..	1.23	2,097	
August 31....	do..	1.96	9,632	
August 31....	do..	1.98	9,953	
August 31....	do..	1 94	9,485	
August 31....	do..	1 94	9,470	
September 1....	do..	2.85	17,182	
September 1....	do..	2.87	17,902	

NOTE.—Gage heights on February 29 and March 1, 1920, were influenced by the dam.



*Discharge measurements of Maragondon River, near Mabaccao,  
Maragondon, Cavite—Continued*

Date	Made by—	Gage height (meters)	Discharge (second- liters)	Remarks
<b>1921</b>				
October 31.....	J. S. Roxas. ....	1.28	2,072	.....
November 1.....	.....do.....	1.30	2,554	.....
December 21.....	.....do.....	1.36	2,486	.....
<b>1922</b>				
March 26.....	.....do.....	1.25	1,604	.....
May 25.....	.....do.....	1.39	3,116	.....
July 12.....	.....do.....	1.73	8,458	.....
August 11.....	.....do.....	1.73	8,546	.....
August 11.....	.....do.....	1.73	8,741	.....
October 7.....	.....do.....	1.60	5,947	.....
December 2.....	.....do.....	1.26	3,449	.....
December 2.....	.....do.....	1.26	2,643	.....



Daily and monthly discharges, in liters per second, of Maragondon River near Mabacac, Maragondon, Cavite, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	1,720	1,360	1,420	1,480	1,600	1,480	8,920	4,300	25,840	5,320	2,440	1,900
2	1,840	1,360	1,420	1,480	1,600	1,480	6,760	3,450	33,760	4,480	2,440	2,080
3	2,200	1,360	1,420	1,480	1,600	2,440	8,080	3,450	27,520	4,240	2,440	1,900
4	2,140	1,360	1,420	1,480	1,600	2,320	3,160	1,840	32,920	4,240	2,800	1,900
5	2,140	1,360	1,420	1,480	1,600	3,460	4,160	1,960	16,020	5,560	2,560	1,900
6	2,140	1,360	1,420	1,480	1,600	5,880	4,600	2,320	8,920	9,920	2,560	1,900
7	2,500	1,360	1,420	1,480	1,600	4,760	6,360	2,320	3,360	8,920	2,320	1,900
8	2,500	1,360	1,420	1,480	1,600	3,460	4,600	2,320	3,360	6,160	3,280	1,900
9	2,500	1,360	1,420	1,480	1,600	2,320	3,940	2,700	3,820	5,080	2,200	3,340
10	2,200	1,360	1,420	1,480	1,480	2,320	2,200	2,320	4,000	4,720	2,200	3,460
11	2,260	1,360	1,420	1,480	1,480	2,320	10,720	2,320	3,400	3,880	2,140	2,320
12	2,260	1,360	1,420	1,540	1,540	2,440	10,480	2,200	3,460	4,300	2,140	2,320
13	2,260	1,360	1,420	1,540	1,600	2,320	11,380	2,200	3,520	4,000	2,140	1,960
14	2,020	1,360	1,420	1,540	1,600	2,920	12,640	10,480	4,000	3,520	2,380	1,960
15	1,960	1,360	1,420	1,540	1,720	5,900	6,280	12,400	3,520	3,520	2,380	2,080
16	1,960	1,360	1,420	1,540	1,960	6,340	9,820	2,560	4,120	3,040	2,440	2,200
17	1,900	1,360	1,420	1,540	2,320	2,200	10,960	3,940	4,360	4,060	2,440	2,080
18	1,840	1,360	1,420	1,540	2,200	1,840	28,120	4,840	3,460	5,320	2,380	1,960
19	1,840	1,360	1,420	1,540	2,200	1,720	15,520	8,320	2,920	4,600	2,320	1,840
20	1,840	1,360	1,420	1,540	2,200	1,720	77,420	3,830	3,340	4,960	2,260	1,780
21	1,840	1,360	1,480	1,540	2,200	1,720	6,400	12,220	3,160	4,120	2,200	1,720
22	1,840	1,360	1,480	1,540	2,260	1,840	5,920	9,340	11,620	3,640	2,200	1,720
23	1,840	1,360	1,480	1,540	2,200	1,780	4,600	4,240	11,620	3,520	2,020	1,720
24	1,840	1,360	1,480	1,540	2,140	1,780	3,520	2,560	9,640	3,520	1,960	1,720
25	1,840	1,420	1,480	1,540	5,440	5,920	25,120	3,280	7,600	2,980	1,960	1,660
26	1,780	1,420	1,480	1,540	5,440	5,920	14,020	2,680	5,920	2,380	1,960	1,660
27	1,600	1,420	1,480	1,540	1,540	11,420	13,120	4,680	4,720	2,440	1,960	1,660
28	1,600	1,420	1,480	1,540	1,480	11,420	13,120	4,680	4,720	2,440	1,960	1,660
29	1,960	1,420	1,480	1,540	1,480	4,320	11,420	2,470	3,700	1,960	1,960	1,660
30	1,420	1,420	1,480	1,540	1,960	3,320	5,920	2,470	4,000	2,320	1,900	1,660
31	1,480	1,480	1,480	1,480	1,720	3,320	5,920	26,920	4,000	2,440	.....	1,660
Maximum	2,260	1,420	1,480	1,600	5,440	11,020	28,120	26,920	33,760	8,920	2,800	3,460
Minimum	1,360	1,360	1,420	1,480	1,360	1,480	2,200	1,840	2,920	2,320	1,900	1,600
Mean	1,919	1,370	1,443	1,519	1,929	3,660	11,246	5,035	8,389	4,120	1,579	2,024

Daily and monthly discharges, in liters per second, of Maragondon River near Mabacao, Maragondon, Cavite, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	1,600	2,800	2,560	1,780	1,300	820	2,598	2,598	13,370	5,472	2,412	5,690
2.....	1,540	2,800	2,920	1,600	1,240	820	2,237	2,352	11,800	3,937	2,352	4,660
3.....	1,420	3,220	3,760	2,960	1,240	880	1,660	2,012	9,310	3,446	2,598	3,852
4.....	1,420	3,640	3,280	2,960	2,960	880	30,650	5,012	10,100	3,070	2,862	3,767
5.....	1,420	3,370	3,280	2,960	2,960	880	161,000	15,012	6,270	2,730	2,352	3,767
6.....	1,420	3,100	2,560	3,100	1,240	1,000	3,694	15,012	5,020	2,379	2,352	3,767
7.....	1,420	3,280	2,920	3,040	1,000	1,300	5,690	96,000	5,910	2,862	2,352	3,625
8.....	1,420	2,800	2,740	3,040	1,000	1,000	5,598	30,550	7,130	2,862	2,352	3,292
9.....	1,540	2,920	2,680	3,100	1,000	3,280	2,412	14,540	1,860	3,532	4,142	3,142
10.....	1,480	3,040	3,100	2,560	1,480	3,400	2,795	10,430	5,690	6,150	5,660	2,998
11.....	1,420	2,800	3,220	3,100	1,060	8,080	2,123	9,460	7,710	4,565	{ 30,856 }	2,998
12.....	1,420	2,800	3,280	3,040	1,060	1,910	1,910	10,770	5,580	3,767	{ 779,700 }	2,998
13.....	1,420	3,040	2,860	3,040	1,000	1,810	1,710	485,000	7,430	3,292	27,300	2,998
14.....	1,420	3,040	3,160	2,920	1,000	1,810	1,660	82,700	11,450	2,998	23,650	2,998
15.....	1,420	3,280	2,800	2,860	1,000	1,910	1,610	633,000	8,410	2,862	17,500	2,930
16.....	1,420	3,100	3,040	3,040	880	1,810	1,610	{ 2,188,000 }	5,690	2,730	10,600	2,862
17.....	1,420	2,800	3,040	2,860	1,000	1,710	1,515	32,475	4,660	2,598	11,620	2,862
18.....	1,540	2,800	2,920	2,680	1,000	1,710	1,610	19,020	3,369	2,532	9,460	2,862
19.....	1,780	2,680	2,560	2,920	1,000	1,660	3,767	42,400	6,630	2,472	7,150	2,795
20.....	2,020	2,740	2,560	3,040	1,060	1,710	1,810	18,760	3,937	2,472	6,030	2,862
21.....	2,680	2,560	2,680	3,040	1,060	1,810	6,150	7,990	5,690	2,472	5,472	2,862
22.....	2,680	3,280	2,560	2,800	1,000	1,760	5,910	5,690	9,620	2,532	6,390	2,795
23.....	2,680	3,040	1,840	2,800	1,120	12,370	75,500	35,150	6,270	2,472	6,150	2,730
24.....	2,680	2,980	1,240	1,600	1,000	1,810	230,000	34,350	7,710	2,472	6,760	2,730
25.....	2,680	3,040	1,240	1,480	880	1,760	14,200	65,150	6,630	2,412	5,690	2,730
26.....	2,620	2,920	1,240	2,860	1,000	1,710	11,620	24,150	6,390	2,412	530,000	2,730
27.....	2,680	2,680	1,240	2,680	1,000	1,710	6,510	7,430	7,430	2,412	24,450	2,664
28.....	2,740	2,800	1,240	2,080	1,000	4,856	5,054	9,780	5,472	2,472	9,460	2,598
29.....	2,740	.....	1,860	2,680	1,000	1,810	3,852	25,675	4,290	2,412	6,390	2,598
30.....	2,740	.....	1,480	2,680	880	1,810	2,730	17,800	9,780	2,412	6,390	2,598
31.....	2,800	.....	1,600	.....	820	.....	2,598	9,460	.....	2,352	.....	2,532
Maximum.....	2,800	3,640	3,280	3,220	2,920	12,370	230,000	2,188,000	13,370	6,150	779,700	5,690
Minimum.....	1,420	2,560	1,240	1,480	820	820	1,515	2,012	3,369	2,352	2,352	2,532
Mean.....	1,925	2,977	2,471	2,656	1,163	2,288	19,486	90,457	7,353	3,151	38,912	3,133

NOTE.—Daily discharge from June 12, 1921, to March 31, 1922 computed by formula  $Q = .105 H^{.85}$

Daily and monthly discharges, in liters per second, of Maragondon River near Mabacao, Maragondon, Cavite, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	2,532	2,237	2,352				3,335	198,300	3,795	3,335	3,725	3,465
2.....	2,237	2,237	2,237				3,215	97,800	3,795	3,465	3,725	3,465
3.....	2,472	2,237	2,237				4,170	30,000	3,725	3,660	3,560	3,465
4.....	2,472	2,237	2,237				3,105	13,670	3,660	3,985	3,370	3,595
5.....	2,352	2,352	2,180				15,480	4,680	3,660	5,945	3,795	3,465
6.....	2,472	2,352	2,180				59,700			5,700	3,725	3,465
7.....	2,472	2,352	2,237				181,800	36,930	3,660			
8.....	2,472	2,294	2,237				81,150	26,700	3,695	5,945	3,725	3,400
9.....	2,412	2,294	2,237				43,200	20,100	3,795	5,690	3,725	3,385
10.....	2,412	2,237	2,237				14,250	12,830	3,725	5,870	3,725	3,275
11.....	2,472	2,237	2,237				3,545	10,560	4,095	5,060	3,660	3,275
12.....	2,472	2,294	2,180				33,200	7,240	3,600	4,000	3,660	3,215
13.....	2,598	2,352	2,237				33,200	6,570	3,600	4,000	3,660	3,215
14.....	2,472	2,294	2,237				6,985	7,565	3,600	5,590	3,660	3,215
15.....	2,412	2,237	2,294				5,945	6,705	3,600	5,060	3,595	3,160
16.....	2,294	2,294	2,237				4,865	6,845	66,300	7,270	3,595	3,160
17.....	2,352	2,294	2,237				4,505	6,445	72,900	6,705	3,595	3,160
18.....	2,294	2,294	2,237				5,370	6,070	79,500	6,195	3,795	3,160
19.....	2,294	2,237	2,123				7,565	5,700	63,000	5,945	3,660	3,160
20.....	2,237	2,294	2,294				14,865	5,480	43,200	5,590	3,660	3,105
21.....	2,237	2,352	2,237				25,050	5,265	36,000	5,160	3,595	3,105
22.....	2,237	2,237	2,237				18,035	5,060	13,670	4,865	3,595	3,275
23.....	2,294	2,237	2,123				11,480	4,865	4,770	4,680	3,595	3,160
24.....	2,294	2,237	2,237				25,380	4,865	3,895	4,260	3,595	3,160
25.....	2,294	2,237	2,180				25,380	4,260	2,795	4,095	3,530	3,105
26.....	2,294	2,237	2,180				29,340	4,170	2,895	4,020	4,020	3,105
27.....	2,352	2,237	2,123				25,050	4,095	3,215	3,795	3,795	3,050
28.....	2,352	2,294	2,237				15,480	4,020	3,105	3,795	3,725	3,050
29.....	2,294		2,180				7,720	3,945	2,995	3,795	3,530	2,995
30.....	2,294		2,237				277,500	3,870		3,725		2,995
31.....			2,237									
Maximum.	2,598	2,352	2,352				277,500	198,300	79,500	9,465	4,020	3,595
Minimum.	2,237	2,237	2,123				3,105	3,870	2,795	3,335	3,630	3,275
Mean.	2,384	2,280	2,222				30,564	18,301	19,983	5,372	3,675	3,225

NOTE.—No record on days for which discharge is not given.

## CAVITE PROVINCE

## MARAGONDON RIVER, MABACCAO, MARAGONDON

LOCATION.—About 1 km. from junction of Maragondon-Magallanes Road with Paso Mabaccao trail which is about 15.8 km. southwest of Naic.

RECORDS AVAILABLE.—From April 4, 1919, to December 31, 1922.

GAGE.—Standard metric-gage board anchored vertically to adobe rocks at the left bank of the river.

DISCHARGE MEASUREMENTS.—Made by wading at section of gage.

CHANNEL AND BANKS.—Channel straight for 51 m. above and 31 m. below the station. Right bank high, steep, and rocky; left bank also high but is overflowed during high water. Stream bed sandy, gravelly, and slightly shifting.

EXTREMES OF DISCHARGE.—Maximum discharge during period of observation, 318,500 second-liters on November 11, 1921; minimum discharge, 1,200 second-liters scattered about in May and June, 1921.

DIVERSIONS.—One above the station, used for power purposes in the mill of Mr. Enrique Punsalan's Hacienda.

REGULATION.—By diversion only.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge determined from a fairly well-defined curve from 2,400 to 52,000 second-liters. Gage read twice daily. Low water measurements may be affected by the irregularities of stream bed.

*Discharge measurements of Maragondon River, near Mabaccao,  
Maragondon, Cavite*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1919</b>				
April 4	J. S. Roxas	58	2,650	
April 15	do	51	2,138	
June 21	do	65	3,961	
July 25	do	94	8,863	
November 9	do	49	5,398	
<b>1920</b>				
January 11	do	32	3,321	
January 14	do	32	3,405	
February 29	do	26	2,875	
March 1	do	23	2,627	
April 30	do	21	2,385	
April 30	dr.	21	2,217	
May 25	do	1 46	25,650	
June 17	do	21	2,045	
August 25	J. Roxas and A. Fegarrido.	65	6,883	
October 26	do	47	5,189	
November 24	J. Roxas.	38	4,049	
<b>1921</b>				
January 7	do	27	2,636	
February 23	do	16	2,269	
March 24	do	18	1,913	
April 14	do	11	1,553	
July 12	do	17	2,394	
August 31	do	1 12	21,500	
September 1	do	1 34	33,108	
September 1	do	1 62	34,881	
October 31	do	29	3,412	
November 1	do	30	3,485	
December 21	do	37	4,373	
<b>1922</b>				
March 26	do	14	2,094	
May 24	do	79	12,264	
May 25	do	59	7,114	
July 12	do	2 20	52,841	
August 10	do	91	14,665	
October 7	do	86	13,834	
December 21	do	25	4,078	

*Daily and monthly discharges, in liters per second, of Maragondon River near Mabacao, Maragondon, Cavite,  
for the year 1919*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1					4,620	13,175	5,395		89,990	8,800	6,070	5,000
2					4,620	31,415	42,815		59,740	8,005	5,935	4,620
3					4,740	13,595	112,815		55,340	9,140	6,070	4,740
4				6,780	4,740	13,175	36,915	28,940	121,340	9,480	5,800	4,740
5				5,870	4,740	13,515	16,020	86,560	53,415	8,160	5,800	4,740
6				5,870	4,740	13,515	16,020	86,560	50,885	8,160	5,800	4,740
7				5,870	4,740	13,515	16,020	86,560	50,885	8,160	5,800	4,740
8				5,870	4,740	13,515	16,020	86,560	50,885	8,160	5,800	4,740
9				5,870	4,740	13,515	16,020	86,560	50,885	8,160	5,800	4,740
10				5,870	4,740	13,515	16,020	86,560	50,885	8,160	5,800	4,740
11				5,870	4,740	13,515	16,020	86,560	50,885	8,160	5,800	4,740
12				5,870	4,740	13,515	16,020	86,560	50,885	8,160	5,800	4,740
13				5,870	4,740	13,515	16,020	86,560	50,885	8,160	5,800	4,740
14				5,870	4,740	13,515	16,020	86,560	50,885	8,160	5,800	4,740
15				5,870	4,740	13,515	16,020	86,560	50,885	8,160	5,800	4,740
16				5,870	4,740	13,515	16,020	86,560	50,885	8,160	5,800	4,740
17				5,870	4,740	13,515	16,020	86,560	50,885	8,160	5,800	4,740
18				5,870	4,740	13,515	16,020	86,560	50,885	8,160	5,800	4,740
19				5,870	4,740	13,515	16,020	86,560	50,885	8,160	5,800	4,740
20				5,870	4,740	13,515	16,020	86,560	50,885	8,160	5,800	4,740
21				5,870	4,740	13,515	16,020	86,560	50,885	8,160	5,800	4,740
22				5,870	4,740	13,515	16,020	86,560	50,885	8,160	5,800	4,740
23				5,870	4,740	13,515	16,020	86,560	50,885	8,160	5,800	4,740
24				5,870	4,740	13,515	16,020	86,560	50,885	8,160	5,800	4,740
25				5,870	4,740	13,515	16,020	86,560	50,885	8,160	5,800	4,740
26				5,870	4,740	13,515	16,020	86,560	50,885	8,160	5,800	4,740
27				5,870	4,740	13,515	16,020	86,560	50,885	8,160	5,800	4,740
28				5,870	4,740	13,515	16,020	86,560	50,885	8,160	5,800	4,740
29				5,870	4,740	13,515	16,020	86,560	50,885	8,160	5,800	4,740
30				5,870	4,740	13,515	16,020	86,560	50,885	8,160	5,800	4,740
31				5,870	4,740	13,515	16,020	86,560	50,885	8,160	5,800	4,740
Maximum				6,780	12,050	31,415	112,815	140,690	89,990	15,100	9,650	6,070
Minimum				3,915	4,620	4,145	5,395	28,940	8,970	7,230	5,800	3,800
Mean				5,201	6,211	8,331	21,160	86,073	29,839	9,928	5,704	4,287

NOTE.—No record of gage heights on day for which discharge is not given.

*Daily and monthly discharges, in liters per second, of Maragondon River near Mabacao, Maragondon, Cavite,  
for the year 1920*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	3,800	3,800	2,750	2,750	2,010	2,190	28,940	10,520	177,440	35,815	4,500	3,465
2.....	3,800	3,800	2,750	3,050	2,100	2,100	12,560	7,230	114,740	27,840	4,500	3,800
3.....	3,800	3,800	2,750	3,050	2,100	2,100	8,610	7,230	192,840	9,210	4,500	3,685
4.....	3,800	3,685	2,750	3,050	2,100	2,370	6,310	5,260	113,915	8,800	4,740	3,570
5.....	3,685	3,800	2,750	3,050	2,100	7,540	6,310	5,260	97,690	15,100	4,620	3,685
6.....	3,800	3,800	2,750	3,050	2,100	8,640	14,455	4,500	26,740	13,380	4,500	4,740
7.....	3,570	3,685	2,750	3,050	2,100	6,630	14,455	4,500	6,930	39,940	4,500	3,685
8.....	3,800	3,800	2,750	3,050	2,370	4,130	6,930	4,500	8,005	13,350	4,500	23,990
9.....	3,570	3,570	2,750	3,050	2,190	2,190	6,485	4,500	9,140	12,560	4,500	9,820
10.....	3,570	4,030	2,750	3,050	1,760	2,190	23,890	4,260	7,540	11,270	4,260	9,820
11.....	3,570	4,030	2,750	3,050	1,925	2,370	33,690	4,030	6,930	10,160	4,260	6,340
12.....	3,800	3,800	2,750	3,050	1,840	2,370	56,715	4,385	6,930	7,645	4,145	4,740
13.....	3,570	3,800	2,750	3,050	1,840	3,150	56,715	4,385	6,930	7,645	4,145	4,385
14.....	3,915	3,360	2,750	3,050	1,840	3,150	26,190	73,290	7,350	6,340	5,000	4,260
15.....	3,360	3,800	2,750	3,050	1,840	11,465	50,390	5,260	9,310	36,090	5,000	4,740
16.....	3,360	3,800	2,750	3,050	2,560	2,870	41,790	27,010	8,005	36,090	4,385	4,030
17.....	3,360	3,800	2,750	3,050	2,010	2,370	87,790	20,360	9,310	26,740	4,385	3,800
18.....	3,655	3,800	2,750	3,050	2,010	2,370	76,240	16,480	8,800	12,970	4,260	3,800
19.....	4,145	2,370	2,750	3,050	1,760	2,370	30,865	18,670	7,350	10,520	4,260	3,685
20.....	4,030	2,750	2,750	3,050	1,760	2,370	21,300	68,815	9,140	10,520	4,145	3,570
21.....	4,030	2,750	2,750	3,050	1,760	1,690	13,160	26,740	25,090	10,160	4,145	3,570
22.....	4,145	2,750	2,750	3,050	1,925	4,030	9,480	9,140	35,265	7,540	4,030	3,465
23.....	4,145	2,750	2,750	3,050	2,010	1,925	7,540	4,260	32,790	7,230	4,030	3,465
24.....	4,030	2,750	2,750	3,050	11,660	33,615	118,865	6,930	25,090	6,070	3,800	3,465
25.....	4,030	2,750	2,750	3,050	33,615	33,615	4,385	6,340	11,270	5,000	3,685	3,360
26.....	4,030	2,750	2,750	3,050	33,615	33,615	39,740	26,740	10,380	4,740	3,685	3,360
27.....	3,800	2,750	2,750	3,050	2,190	3,150	23,840	8,160	10,380	4,500	3,465	3,685
28.....	3,800	2,685	2,750	3,050	2,190	1,660	31,440	12,560	10,380	4,740	3,685	3,160
29.....	3,800	2,750	2,750	3,050	2,010	1,660	31,440	10,380	12,560	4,400	3,465	3,160
30.....	3,800	2,750	2,750	2,560	3,570	23,390	16,560	17,390	12,970	4,500	3,465	3,160
31.....	3,800	2,750	2,750	2,560	3,570	23,390	16,560	17,390	12,970	4,500	3,465	3,160
Maximum.....	4,145	4,260	2,750	3,050	11,660	35,540	118,865	171,390	192,840	39,940	5,000	23,990
Minimum.....	3,360	2,370	2,750	2,560	1,760	1,680	4,500	4,030	6,930	4,500	3,465	3,160
Mean.....	3,751	3,422	2,750	3,024	2,493	8,886	31,930	18,714	33,376	12,513	4,258	4,633

Note.—Daily discharge in March and April, unreliable.



*Daily and monthly discharges, in liters per second, of Maragondon River near Mabacao, Maragondon, Cavite,  
for the year 1921*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	3,050	3,365	2,230	1,600	1,200	1,280	2,560	2,630	34,130	11,090	3,560	14,230
2.....	2,950	3,670	2,370	1,600	1,280	1,200	1,760	2,040	21,520	8,620	3,400	11,530
3.....	2,950	3,670	2,370	1,600	1,280	1,360	1,360	1,500	20,500	7,050	4,530	9,830
4.....	2,750	4,260	2,370	1,600	1,280	1,520	36,365	1,260	22,300	6,300	3,560	9,220
5.....	2,850	3,915	2,350	1,680	1,360	1,200	86,690	1,500	14,920	5,400	3,400	8,420
6.....	2,850	3,685	2,465	1,760	1,280	1,200	6,340	31,160	13,770	9,220	3,240	8,220
7.....	2,750	3,360	2,280	1,840	1,200	1,760	4,500	109,000	10,670	5,940	3,400	7,820
8.....	2,850	3,360	2,280	1,925	1,200	1,280	3,050	41,960	22,820	9,420	3,560	7,060
9.....	2,850	3,150	2,280	2,010	1,360	1,925	2,950	18,250	15,150	8,620	1,930	7,060
10.....	2,750	2,950	2,230	1,680	1,200	5,800	3,570	14,000	12,410	12,850	11,930	6,300
11.....	2,750	3,360	2,190	1,680	1,280	34,440	2,560	12,190	16,540	9,220	{ 318,500 41,960 }	6,300
12.....	2,750	3,150	2,100	1,600	1,200	2,010	1,840	14,000	11,090	7,430	51,410	5,940
13.....	2,750	3,150	2,010	1,600	1,200	1,925	1,680	223,000	17,020	6,300	36,020	5,580
14.....	2,750	3,150	2,010	1,440	1,200	1,840	1,520	71,000	12,410	5,580	30,620	5,940
15.....	2,750	2,750	2,010	1,520	1,200	1,760	1,360	216,000	20,500	5,220	24,680	5,580
16.....	2,750	3,150	1,925	1,520	1,440	1,680	1,440	237,000	14,000	4,870	23,080	5,220
17.....	2,850	3,050	1,840	1,360	1,280	1,280	1,360	48,710	9,220	4,530	28,460	5,040
18.....	2,850	2,950	2,010	1,360	1,280	1,280	1,440	25,430	6,670	4,200	21,520	4,870
19.....	3,360	2,655	2,010	1,440	1,280	1,440	4,260	50,060	12,410	4,200	12,850	4,870
20.....	3,465	2,560	1,840	1,440	1,360	1,360	2,370	23,060	6,480	4,040	11,090	4,870
21.....	3,150	2,010	1,840	1,360	1,440	1,680	6,340	14,460	8,020	4,040	9,830	4,700
22.....	3,050	2,010	2,010	1,360	1,440	1,520	5,530	10,670	21,520	3,880	14,320	4,700
23.....	3,150	2,010	1,760	1,360	1,440	26,740	62,430	48,710	17,750	3,880	17,020	4,530
24.....	3,150	2,010	1,840	1,360	1,280	1,760	113,480	65,700	12,550	3,880	17,020	4,530
25.....	3,050	2,100	1,760	1,360	1,760	1,925	20,540	31,700	32,700	3,560	252,500	4,380
26.....	3,150	2,100	1,840	1,360	1,840	1,360	20,880	15,610	12,410	3,560	47,710	4,200
27.....	3,050	2,100	1,840	1,360	1,600	1,200	15,150	15,610	15,150	3,720	26,030	4,200
28.....	3,360	2,010	1,760	1,360	1,520	7,385	11,530	22,560	10,880	3,720	18,750	4,200
29.....	3,465	.....	1,680	1,360	1,360	1,680	4,450	46,010	9,020	3,560	18,750	4,200
30.....	3,360	.....	1,680	1,280	1,360	3,050	3,240	26,300	18,250	3,400	.....	4,200
31.....	3,360	.....	1,680	.....	1,360	.....	2,630	21,520	.....	3,400	.....	4,040
Maximum.....	3,465	4,260	2,350	2,010	1,840	34,440	113,345	237,000	34,130	-2,850	318,500	14,230
Minimum.....	2,750	2,010	1,680	1,280	1,200	1,200	1,360	1,260	6,480	3,400	3,240	3,400
Mean.....	3,001	2,906	2,052	1,526	1,360	3,855	14,325	48,033	15,138	5,818	30,107	6,184

*Daily and monthly discharges, in liters per second, of Maragondon River near Mabacao, Maragondon, Cavite, for the year 1922*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	4,040	4,200	1,630	..	..	..	3,400	206,660	4,360	13,310	5,580	4,040
2	3,820	4,200	1,630	..	..	..	3,080	98,660	4,360	25,760	5,580	4,040
3	3,840	3,880	1,500	..	..	..	2,930	41,960	4,200	23,080	5,220	4,140
4	3,880	3,880	1,500	..	..	..	4,870	28,460	4,200	19,250	7,050	4,530
5	3,880	3,560	1,380	..	..	..	18,750	15,610	4,040	15,610	6,480	4,040
6	3,720	3,560	1,500	..	..	..	32,780	39,260	4,040	13,540	5,940	5,400
7	3,720	3,560	1,500	..	..	..	119,660	31,160	4,040	11,970	5,580	5,400
8	3,720	3,560	1,630	..	..	..	51,410	28,460	4,360	11,090	5,220	5,220
9	3,560	3,560	1,500	..	..	..	23,600	25,220	4,200	10,670	4,870	5,040
10	3,560	3,560	1,500	..	..	..	10,670	18,000	5,040	10,670	4,000	5,040
11	3,560	3,560	1,500	..	..	..	52,050	12,410	32,780	9,020	4,580	4,870
12	3,720	3,400	1,380	..	..	..	41,960	11,090	39,260	11,090	4,360	4,870
13	4,200	3,560	1,630	..	..	..	18,000	12,850	44,560	10,040	4,360	4,870
14	4,700	3,560	1,630	..	..	..	9,020	11,090	50,060	9,020	4,360	4,870
15	5,220	3,240	1,500	..	..	..	7,240	11,750	71,660	21,780	4,360	4,700
16	5,220	3,400	1,630	..	..	..	7,050	11,090	85,160	19,250	4,360	4,700
17	4,870	3,400	1,500	..	..	..	8,420	10,670	98,660	17,020	5,220	2,780
18	4,700	3,240	1,500	..	..	..	12,850	10,250	82,460	15,610	4,700	2,780
19	4,700	2,930	1,260	..	..	..	20,500	10,040	50,060	14,460	4,530	2,780
20	4,700	2,930	1,630	..	..	..	30,620	9,830	39,260	11,090	4,360	2,780
21	4,530	2,930	1,500	..	..	..	13,310	6,120	28,460	9,830	4,360	3,560
22	4,530	2,630	1,500	..	..	..	18,000	5,940	31,160	9,020	4,200	4,530
23	4,530	2,930	1,500	..	..	..	39,260	5,760	32,510	8,220	4,200	2,780
24	4,530	2,040	1,630	..	..	..	31,160	5,580	21,780	7,430	4,200	2,780
25	4,530	1,630	1,500	..	..	..	29,270	5,040	15,610	6,250	4,200	2,680
26	4,360	1,500	1,260	..	..	..	32,780	5,760	19,250	6,300	5,220	2,680
27	4,360	1,500	1,500	..	..	..	24,140	4,870	19,250	5,940	4,700	2,480
28	4,360	1,760	1,380	..	..	..	15,610	4,700	14,690	5,580	4,200	2,480
29	4,360	1,760	1,380	..	..	..	287,660	4,530	..	..	..	2,480
30	4,360	1,380	1,380	..	..	..	287,660	4,530	..	..	..	2,480
31	4,200	4,200	1,630	..	..	..	287,660	4,530	..	..	..	2,480
Maximum	5,220	4,200	1,630	..	..	..	287,660	206,660	98,660	25,760	7,050	5,400
Minimum	3,560	1,500	1,260	..	..	..	2,930	4,530	4,040	5,580	4,040	2,480
Mean	4,294	3,109	1,491	..	..	..	35,138	22,980	28,109	12,068	4,899	3,815

NOTE.—No record on days for which discharge is not given.

## CAVITE PROVINCE

## PATAY-NA-ILAT CANAL, CARMONA

LOCATION.—In the southwestern part of the town of Carmona and about 1.4 km. from the municipal building.

RECORDS AVAILABLE.—From June 18, 1921, to March 31, 1922.

GAGE.—A metric gage board placed on the right bank of the river.

DISCHARGE MEASUREMENTS.—Made by .61 m. sharp-crested with complete end contractions at 2 m. below gage.

CHANNEL AND BANKS.—Channel straight for 10 m. above and 2 m. below the weir; channel immediately above the weir dug out to make velocity of approach practically nil; both banks low and of earthy texture.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 172 second-liters on November 29, 1921; water shut off occasionally.

DIVERSIONS.—Canal diverts part of flow of Carmona River.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Conditions at weir fairly good. Records fair for all stages.

*Daily and monthly discharges, in liters per second, of Patay-Na-Ilal Canal near Bankal, Carmona, Cavite,  
for the year 1921*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....							45	34	87	81	34	(d)
2.....							45	39	81	(d)	34	(d)
3.....							45	45	56	45	35	(d)
4.....							129	45	62	45	45	(d)
5.....								39	62	45	25	(d)
6.....							16	34	50	45	45	(d)
7.....							25	143	68	45	34	(d)
8.....							39	114	82	45	39	(d)
9.....							45	150	56	25	45	(d)
10.....							45	166	50	39	39	(d)
11.....							45	45	45	39	156	(d)
12.....							45	45	45	39	156	(d)
13.....							45	74	50	45	1	39
14.....							50	81	50	45	1	34
15.....							45	122	50	45	6	29
16.....							34	50	50	45	6	45
17.....							25	29	50	45	3	(d)
18.....							45	45	45	45	1	(d)
19.....						45	45	45	45	45	(d)	29
20.....						50	39	56	45	45	(d)	(d)
21.....						39	45	56	45	45	165	25
22.....						39	45	50	45	45	9	(d)
23.....						39	45	50	45	45	165	(d)
24.....						50	34	56	45	29	1	16
25.....						50	34	56	45	45	172	(d)
26.....						45	34	56	45	45	172	(d)
27.....						45	34	62	45	(d)	9	(d)
28.....						45	39	68	45	(d)	3	(d)
29.....						62	81	81	45	45	1	(d)
30.....						45	34	87	87	45	45	(d)
31.....							34	74	.....	45	.....	(d)
Maximum.....						50	129	143	87	81	172	45
Minimum.....						39	16	63	29	25	1	16
Mean.....						44	44	63	54	44	36	31

NOTE.—Discharge determined by formula,  $Q = 1.838 (L - .2H) H^{\frac{3}{2}}$

<sup>a</sup> Channel dry.

*Daily and monthly discharges, in liters per second, of Fatay-Na-Ilal Canal near Bankal, Carmona, Cavite,  
for the year 1922*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.	(4)	39	39	.....	.....	.....	.....	.....	.....	.....	.....	.....
2.	(4)	34	34	.....	.....	.....	.....	.....	.....	.....	.....	.....
3.	(4)	45	45	.....	.....	.....	.....	.....	.....	.....	.....	.....
4.	(4)	34	34	.....	.....	.....	.....	.....	.....	.....	.....	.....
5.	(4)	39	39	.....	.....	.....	.....	.....	.....	.....	.....	.....
6.	9	25	34	.....	.....	.....	.....	.....	.....	.....	.....	.....
7.	50	34	39	.....	.....	.....	.....	.....	.....	.....	.....	.....
8.	34	34	45	.....	.....	.....	.....	.....	.....	.....	.....	.....
9.	34	34	34	.....	.....	.....	.....	.....	.....	.....	.....	.....
10.	50	45	34	.....	.....	.....	.....	.....	.....	.....	.....	.....
11.	50	45	39	.....	.....	.....	.....	.....	.....	.....	.....	.....
12.	50	45	34	.....	.....	.....	.....	.....	.....	.....	.....	.....
13.	50	45	34	.....	.....	.....	.....	.....	.....	.....	.....	.....
14.	50	45	34	.....	.....	.....	.....	.....	.....	.....	.....	.....
15.	50	39	34	.....	.....	.....	.....	.....	.....	.....	.....	.....
16.	50	39	34	.....	.....	.....	.....	.....	.....	.....	.....	.....
17.	39	45	34	.....	.....	.....	.....	.....	.....	.....	.....	.....
18.	39	45	39	.....	.....	.....	.....	.....	.....	.....	.....	.....
19.	34	39	34	.....	.....	.....	.....	.....	.....	.....	.....	.....
20.	29	45	34	.....	.....	.....	.....	.....	.....	.....	.....	.....
21.	39	39	34	.....	.....	.....	.....	.....	.....	.....	.....	.....
22.	50	34	34	.....	.....	.....	.....	.....	.....	.....	.....	.....
23.	45	29	34	.....	.....	.....	.....	.....	.....	.....	.....	.....
24.	45	29	34	.....	.....	.....	.....	.....	.....	.....	.....	.....
25.	45	29	34	.....	.....	.....	.....	.....	.....	.....	.....	.....
26.	45	29	34	.....	.....	.....	.....	.....	.....	.....	.....	.....
27.	45	29	34	.....	.....	.....	.....	.....	.....	.....	.....	.....
28.	34	29	34	.....	.....	.....	.....	.....	.....	.....	.....	.....
29.	34	29	34	.....	.....	.....	.....	.....	.....	.....	.....	.....
30.	34	.....	34	.....	.....	.....	.....	.....	.....	.....	.....	.....
31.	45	.....	34	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maximum.....	50	45	45	.....	.....	.....	.....	.....	.....	.....	.....	.....
Minimum.....	9	29	34	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mean.....	41	38	35	.....	.....	.....	.....	.....	.....	.....	.....	.....

<sup>a</sup> Channel dry.

## CAVITE PROVINCE

## TATLONG BALON RIVER, NAIC

LOCATION.—Near Timalan Railroad Station and General Aguinaldo's Dam site, which is about 1.8 km. 542° 00' E of General Aguinaldo's house.

RECORDS AVAILABLE.—From November 11, 1919, to March 19, 1922.

GAGE.—Standard metric-gage board nailed vertically to Bulong tree on left bank of river.

DISCHARGE MEASUREMENTS.—Made by a sharp-crested weir at 1.20 m. below gage.

CHANNEL AND BANKS.—Channel straight for 24 m. above the weir then forming a big pond which eliminates velocity of approach. Banks high and subject to overflow only during extreme floods. Above weir stream bed of adobe stone, clay and dirt; below weir, of gravel.

EXTREMES OF DISCHARGE.—The maximum discharge recorded during the period of observation, 123.1 second-liters on September 29, 1920, River was dry several times on the later part of March, 1922.

DIVERSIONS.—General Aguinaldo's Dam at 10.40 m. below.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Results fairly accurate, being measured and computed from mathematical formula. Gage read twice daily. Water higher than gage height .501 m. giving a discharge of 124.70 second-liters not recorded due to absence of gage for high water mark.

*Discharge measurements of Tatlong Balon River, near Naic, Cavite*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1919</b>				
November 11. . . . .	J. S. Roxas. . . . .	.36	6	. . . . .
<b>1922</b>				
May 23 . . . . .	.do. . . . .	.39	69	. . . . .
July 12. . . . .	.do. . . . .	.27	18	. . . . .
August 12. . . . .	.do. . . . .	.14	31	. . . . .

Daily and monthly discharges, in liters per second, of Tatlong Balon River near Timalan, Naic, Cavite, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	16.9
2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8.0
3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10.7
4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10.7
5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	13.7
6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	16.9
7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	16.9
8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10.7
9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10.7
10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8.0
11	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8.0
12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8.0
13	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10.7
14	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8.0
15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8.0
16	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8.0
17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8.0
18	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8.0
19	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8.0
20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8.0
21	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8.0
22	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8.0
23	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8.0
24	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8.0
25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8.0
26	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8.0
27	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8.0
28	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8.0
29	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8.0
30	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8.0
31	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8.0
Maximum	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	16.9
Minimum	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8.0
Mean	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8.9

NOTE.—Gaging station established on November 11, 1919. Weir constructed on December 24, 1919.

*Daily and monthly discharges, in liters per second, of Tailong Balon River near Timalan, Naic, Cavite, for the year 1920*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	10.4	13.4	6.9	6.9	6.4	5.3	31.5	15.9	...	111.1	11.6	11.6
2.....	10.4	13.1	7.4	6.9	6.4	5.3	23.9	8.0	...	106.9	10.7	16.5
3.....	11.3	12.8	7.4	6.9	6.2	4.6	10.7	7.7	...	...	9.6	19.6
4.....	12.2	12.8	7.2	6.9	6.0	4.4	8.0	7.4	...	...	103.6	18.6
5.....	14.3	13.1	7.4	6.9	5.7	101.5	...	6.9	117.0	53.8	101.2	23.1
6.....	16.9	13.1	6.9	6.9	5.7	3.7	108.0	6.4	33.9	44.8	103.6	...
7.....	18.2	13.1	7.4	6.9	5.5	4.1	107.4	3.9	33.1	43.1	45.7	...
8.....	19.2	13.1	6.9	6.9	5.3	4.1	106.9	2.4	15.6	41.4	91.5	...
9.....	18.2	12.5	6.9	6.9	5.0	4.6	110.6	2.2	6.9	36.3	87.7	...
10.....	18.9	14.9	6.9	6.9	5.0	4.6	113.3	2.1	3.7	36.3	85.7	79.8
11.....	18.2	12.2	6.9	6.9	5.0	4.8	...	1.9	4.1	63.6	82.7	33.9
12.....	12.6	11.9	6.9	6.9	5.0	4.8	...	1.9	2.2	70.9	74.8	24.6
13.....	12.8	11.9	6.9	6.7	4.8	5.0	116.0	1.7	3.7	68.9	82.8	23.1
14.....	11.3	11.9	6.9	6.7	4.8	4.6	...	1.6	14.9	67.0	92.6	15.6
15.....	11.9	11.9	6.9	6.7	4.8	3.2	118.7	67.9	9.0	64.1	...	11.9
16.....	12.5	11.6	6.9	6.9	4.6	2.9	...	118.7	6.4	66.0	...	9.6
17.....	12.5	10.4	6.9	6.4	4.6	2.9	...	97.3	6.0	...	119.8	11.7
18.....	13.1	10.4	6.9	6.4	4.6	2.7	...	96.2	5.0	...	116.5	9.0
19.....	13.7	11.6	6.9	6.4	4.6	2.4	...	99.4	5.0	...	100.7	6.9
20.....	13.1	11.9	6.9	6.4	4.6	2.2	122.0	108.5	5.3	94.1	93.1	6.0
21.....	13.7	11.9	6.9	6.4	4.6	2.2	118.7	118.7	48.8	80.8	85.7	9.0
22.....	13.7	11.9	6.9	6.4	4.6	2.9	118.7	113.3	48.8	79.3	68.9	8.7
23.....	13.4	11.6	6.9	6.4	4.6	3.9	89.5	113.8	46.6	106.0	30.7	6.2
24.....	13.3	11.6	6.9	6.4	4.6	4.8	31.5	113.3	55.6	66.0	22.4	6.4
25.....	15.6	11.6	6.9	6.7	4.6	4.1	11.0	30.7	107.5	35.5	5.0	6.4
26.....	18.7	11.6	6.9	6.4	4.6	4.6	10.7	10.7	112.2	14.3	3.7	6.4
27.....	18.1	11.9	6.9	6.4	4.6	4.4	...	114.3	97.9	12.5	1.3	3.7
28.....	12.8	11.9	6.9	6.4	4.6	92.1	122.5	113.3	123.1	13.1	1.7	4.1
29.....	13.1	6.9	6.9	6.4	4.8	110.6	122.0	113.8	119.2	15.0	2.4	4.1
30.....	13.1	...	6.9	6.4	4.8	110.0	116.0	110.0	122.0	14.6	2.4	3.7
31.....	13.1	...	6.9	6.4	5.0	...	18.6	114.3	116.0	13.7	2.5	4.6
Maximum.....	19.2	14.9	7.4	6.9	6.4	110.6	122.5	118.7	123.1	111.1	119.8	79.8
Minimum.....	10.4	6.9	6.9	6.4	4.6	2.2	8.0	1.6	2.2	12.5	1.3	3.7
Mean.....	13.9	12.0	7.0	6.7	5.1	17.8	76.1	53.5	46.9	54.1	56.6	13.8

Note.—Water overtopped weir on days for which discharge is not given.



Daily and monthly discharges, in liters per second, of Tailong Balon River near Timalan, Naic, Cavite, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	5	0.3	2	0	No flow	3	3	13	113	102	8	102
2	5	2.0	3	0	No flow	2	5	5	67	67	5	92
3	5	3	3	0	No flow	2	5	5	118	118	13	81
4	8	3	2	0	No flow	2	5	5	2	2	13	81
5	8	10	2	0	No flow	3	5	2	2	2	10	67
6	8	8	2	0	No flow	5	5	2	2	2	10	67
7	8	10	10	0	No flow	5	5	2	2	2	10	67
8	5	5	18	No flow	No flow	10	8	5	2	2	8	62
9	3	16	5	5	No flow	8	0	11	43	62	2	62
10	3	13	5	5	No flow	8	0	11	43	62	2	62
11	3	8	5	5	No flow	8	0	11	43	62	2	62
12	3	5	8	5	No flow	8	0	11	43	62	2	62
13	3	3	3	2	No flow	3	2	10	118	7	35	48
14	3	3	3	2	No flow	3	2	10	118	7	35	48
15	3	3	3	2	No flow	3	2	10	118	7	35	48
16	3	3	3	2	No flow	3	2	10	118	7	35	48
17	3	3	3	2	No flow	3	2	10	118	7	35	48
18	5	0	2	0	No flow	3	2	10	118	7	35	48
19	5	0	2	0	No flow	3	2	10	118	7	35	48
20	3	2	2	0	No flow	3	2	10	118	7	35	48
21	3	2	2	0	No flow	3	2	10	118	7	35	48
22	3	2	2	0	No flow	3	2	10	118	7	35	48
23	3	2	2	0	No flow	3	2	10	118	7	35	48
24	3	2	2	0	No flow	3	2	10	118	7	35	48
25	3	2	2	0	No flow	3	2	10	118	7	35	48
26	2	2	0	0	No flow	3	2	10	118	7	35	48
27	2	2	0	0	No flow	3	2	10	118	7	35	48
28	2	2	0	0	No flow	3	2	10	118	7	35	48
29	2	2	0	0	No flow	3	2	10	118	7	35	48
30	2	2	0	0	No flow	3	2	10	118	7	35	48
31	0	3	2	0	No flow	3	2	10	118	7	35	48
Maximum	8	16	10	0	13	10	10	11	118	10	12	10
Minimum	0	0	0	0	0	0	0	0	0	0	0	0
Mean	3	4	2	0	3	4	3	6	7	3	6	3

NOTE.—No record on August 12, 13, 15 to 17, 24, 25, 28 to 30 and on November 12 to 16, 21, 23, 25, and 26 due to flood.



## CAVITE PROVINCE

## ULANG TUBIG RIVER, CARMONA

LOCATION.—In the southwestern part of the town of Carmona and about 1.3 km. from the municipal building.

RECORDS AVAILABLE.—From June 17, 1921, to March 31, 1922.

GAGE.—Metric gage board vertically set on the left bank of the river.

DISCHARGE MEASUREMENTS.—Made by .61 m. sharp-crested weir with complete end contractions, 2.75 m. below the gage and about  $\frac{1}{2}$  km. above the dam on the Ulang Tubig River.

CHANNEL AND BANKS.—Channel straight; natural pond formed above the weir. Bed of river of adobe stone. Both banks low and of adobe stone and steady earth.

EXTREMES OF DISCHARGES.—Maximum discharge recorded during period of observation, 263 second-liters on November 11 and 26, 1921; water shut off sometimes.

DIVERSIONS.—Water sometimes diverted to rice fields.

REGULATION.—None except by diversion.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Conditions at weir fairly good. Records fair for all stages.

*Daily and monthly discharges, in liters per second, of Ulang Tubig River near Bankal, Carmona, Cavite, for the year 1921*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....							9	25	81	68	12	62
2.....							9	12	50	62	12	68
3.....							151	3	12	6	12	68
4.....							74	16	12	29	39	62
5.....							50	25	9	29	6	62
6.....							34	50	12	6	12	62
7.....							12	34	12	6	9	62
8.....							9	12	9	34	20	62
9.....							9	122	45	20	263	9
10.....							9	25	100	20	87	9
11.....							9	12	6	16	68	20
12.....							9	29	12	9	81	39
13.....							6	87	6	12	87	29
14.....							3	198	20	12	81	56
15.....							16	114	20	12	68	50
16.....							25	100	20	9	56	29
17.....							16	25	20	9	56	56
18.....							12	12	16	9	56	56
19.....							34	12	12	9	56	56
20.....							12	12	9	9	255	39
21.....							9	12	9	12	87	56
22.....							20	9	9	16	94	45
23.....							25	6	9	25	52	56
24.....							25	6	9	29	263	56
25.....							25	6	9	62	81	56
26.....							16	12	9	62	68	56
27.....							29	39	9	29	62	56
28.....							25	56	81	6	62	56
29.....							25	29	.....	.....	.....	56
30.....							25	29	.....	.....	.....	56
31.....							25	29	.....	.....	.....	56
Maximum.....						50	151	198	100	68	263	68
Minimum.....						6	3	3	6	6	6	9
Mean.....						18	24	37	21	21	71	51

NOTE.—Discharge determined by weir formula,  $Q = 1.838 (L - 2 H) H^2$ .

Daily and monthly discharges, in liters per second, of Ulang Tubig River near Bankal, Carmona, Cavite, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	54	8	13									
2	54	13	4									
3	54	10	6									
4	53	6	8									
5	36	8	5									
6	33	12	4									
7	( <sup>a</sup> )	14	3									
8	16	12	3									
9	10	10	8									
10	4	4	7									
11	( <sup>a</sup> )	1	8									
12	( <sup>a</sup> )	1	8									
13	( <sup>a</sup> )	3	8									
14	( <sup>a</sup> )	5	8									
15	( <sup>a</sup> )	5	8									
16	( <sup>a</sup> )	5	8									
17	11	5	5									
18	11	5	7									
19	15	5	7									
20	18	4	7									
21	( <sup>a</sup> )	4	7									
22		9	7									
23	2	14	7									
24	3	14	7									
25	3	14	7									
26	4	14	7									
27	4	14	7									
28	8	14	7									
29	12	7	7									
30	7	7	7									
31	3	7	7									
Maximum	54	14	13									
Minimum	2	1	3									
Mean	19	8	7									

<sup>a</sup> Channel dry. See footnote to discharge table for 1921.

## CEBU PROVINCE

### MANANGA RIVER, TALISAY

**LOCATION.**—About 4 km. northwest of Talisay and about 10 km. from Cebu City on the Cebu-Toledo Road.

**RECORDS AVAILABLE.**—From January 3, 1922, to December 31, 1922.

**GAGE.**—Standard metric board vertically fastened to a limestone rock on the right bank of the river.

**DISCHARGE MEASUREMENTS.**—Made by wading.

**CHANNEL AND BANKS.**—One channel at all stages; straight for 100 m. above and 200 m. below the station. Bed of stream sandy and very shifting. Right bank steep and of limestone; left bank low, sloping.

**EXTREMES OF DISCHARGE.**—Maximum discharge recorded during period of observation, 91,695 second-liters on May 21, 1922; minimum discharge, 95 second-liters on May 3, 1922.

**DIVERSIONS.**—None.

**REGULATION.**—None.

**UTILIZATION.**—For irrigation purposes.

**ACCURACY.**—Gage read twice daily. Daily gage-height corrections applied. Record good below 13,000 second-liters.

*Discharge measurements of Mananga River, near Tabanok, Talisay, Cebu*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1922</b>				
January 3.....	A. Baldonado and D. Mercado.	.56	1,030	....
January 13.....	A. Baldonado.....	.68	2,180	.....
February 3.....	do.....	.60	990	.....
March 11.....	do.....	.60	820	.....
March 21.....	do.....	.58	660	.....
April 22.....	do.....	.55	386	.....
May 20.....	do.....	.59	785	.....
June 15.....	do.....	.65	1,131	.....
August 5.....	do.....	.55	1,600	.....
September 2.....	do.....	.58	840	.....
October 17.....	do.....	.72	3,014	.....
October 31.....	do.....	.68	3,030	.....
November 29.....	do.....	.65	860	.....
December 15.....	do.....	.60	1,090	.....

Daily and monthly discharges, in liters per second, of Mananga River near Tabonok, Takasay, Cebu, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	...	1,985	785	440	440	7,180	8,045	4,225	785	260	2,180	440
2	...	1,985	785	440	335	6,780	9,080	3,470	785	260	1,635	440
3	1,175	1,325	785	440	95	7,180	5,375	3,235	660	260	1,325	260
4	...	1,325	785	440	260	6,045	4,780	2,795	550	1,035	1,635	550
5	...	1,035	785	440	785	6,400	4,500	2,580	550	1,480	1,480	335
6	1,325	785	660	550	5,705	5,075	3,470	2,375	1,035	1,480	1,325	195
7	910	1,325	660	440	5,075	4,500	3,015	2,795	910	2,375	1,035	260
8	785	1,035	660	440	4,225	4,225	3,235	2,375	2,580	1,805	910	910
9	550	910	660	440	3,960	3,960	3,235	2,180	2,580	1,805	660	910
10	1,985	910	550	440	1,325	3,960	7,085	2,180	2,580	1,805	660	260
11	...	1,985	550	440	2,180	3,235	2,575	1,805	1,635	3,470	550	195
12	6,780	660	550	335	910	2,580	5,705	1,805	5,075	2,375	1,175	260
13	2,180	785	660	660	785	2,375	22,320	1,480	2,375	4,225	660	2,375
14	2,180	910	785	440	555	1,985	5,075	1,480	2,375	3,470	550	660
15	...	910	785	440	550	1,175	4,500	1,480	1,325	3,015	660	550
16	2,180	1,635	1,035	440	910	1,175	13,070	1,325	1,175	2,795	660	260
17	1,805	910	1,175	440	5,705	910	13,670	1,175	1	3,710	440	550
18	1,805	785	1,035	440	1,915	1,035	16,845	1,175	785	3,470	440	1,325
19	1,635	660	660	440	1,175	2,375	6,780	1,035	660	7,595	1,175	550
20	1,805	1,480	660	335	91	3,015	13,995	910	660	4,500	1,805	210
21	1,035	3,705	660	440	66,675	3,235	5,705	785	240	2,795	1,805	260
22	36,190	1,035	550	440	35,270	3,015	3,705	785	550	1,480	1,325	260
23	10,395	910	550	440	24,440	3,015	4,500	785	510	1,175	1,035	140
24	...	910	550	440	24,440	3,015	3,235	785	910	1,175	1,325	28,735
25	5,075	910	550	335	15,845	3,015	4,500	660	785	2,180	1,035	6,780
26	3,960	660	550	335	13,995	3,015	4,500	550	440	2,180	785	4,500
27	7,410	550	550	440	11,220	5,075	7,180	550	335	2,180	660	3,960
28	3,710	1,035	550	335	8,540	5,075	8,045	785	550	4,780	440	2,580
29	2,580	...	440	335	7,595	3,470	5,375	660	440	4,500	660	3,015
30	2,180	...	440	335	6,780	3,015	4,780	550	335	3,470	550	2,180
31	1,985	...	440	...	6,780	...	3,960	440	...	3,015	...	1,635
Maximum	36,190	3,235	1,175	660	91,695	7,180	76,895	4,225	5,075	7,595	2,180	28,735
Minimum	260	1,550	550	260	95	3,668	3,015	1,592	335	260	440	140
Mean	3,803	1,200	672	428	10,347	3,668	9,734	1,592	1,110	2,660	1,012	2,123

NOTE.—River bed very shifting; daily gage-height corrections made.

## CEBU PROVINCE

## MANTAYUPAN RIVER, BARILI

LOCATION.—About 3.5 km. southeast of Barili, and just above the Mantayupan falls. The station can be reached by following a trail from the Government sanitarium near Bolocboloc spring.

RECORDS AVAILABLE.—From May 11, 1921, to December 31, 1922.

GAGE.—Metric-gage board.

DISCHARGE MEASUREMENTS.—Made by 2.45 m. sharp-crested weir with complete end contractions 2 m. below gage; and also by current meter.

CHANNEL AND BANKS.—Channel forms a pond above the weir; both banks high and of limestone formation.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 3,270 second-liters on January 27 and May 24, 1922; minimum discharge, 278 second-liters on May 11-16, 1921 and July 27-31, 1922. Maximum capacity of weir is 258 second-liters.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For power.

ACCURACY.—Conditions at weir fairly good.



Daily and monthly discharges, in liters per second, of Mantayupan River near Barili, Cebu, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....						646	646	1,100	457	379	2,310	1,100
2.....						646	646	1,100	457	379	2,310	1,100
3.....						646	646	920	457	379	1,990	1,670
4.....						646	646	1,350	457	379	1,990	1,670
5.....						646	920	1,100	920	457	1,100	1,350
6.....						646	646	1,350	920	457	1,100	2,680
7.....						646	646	1,100	770	457	1,100	1,670
8.....						646	770	1,100	646	546	1,100	1,100
9.....						320	646	920	646	546	1,670	1,100
10.....						646	646	920	646	646	1,100	1,100
11.....					278	646	646	920	646	646	2,310	1,100
12.....					278	646	920	770	770	770	2,310	1,670
13.....					278	646	646	770	646	646	1,990	1,990
14.....					278	646	920	646	646	646	1,990	1,350
15.....					278	646	920	646	646	646	1,990	1,350
16.....					278	646	920	646	646	646	1,670	1,350
17.....					646	646	920	646	646	920	1,100	920
18.....					1,670	646	920	646	646	1,100	1,350	920
19.....					1,350	546	1,100	646	646	1,350	1,350	1,100
20.....					920	920	1,100	546	457	1,350	1,350	1,670
21.....					920	2,150	1,100	546	457	1,350	1,990	1,100
22.....					379	1,350	1,350	457	457	1,350	1,990	1,100
23.....					379	1,350	1,100	457	457	1,350	1,990	1,350
24.....					320	920	1,100	457	457	1,350	1,990	1,350
25.....					320	920	1,100	457	457	1,670	1,990	1,350
26.....					320	920	920	457	457	1,990	1,990	1,990
27.....					320	646	646	457	457	2,310	1,670	1,990
28.....					320	546	646	457	379	2,680	1,350	1,990
29.....					646	457	1,990	646	379	2,680	1,350	1,990
30.....					646	457	1,670	457	379	2,680	1,100	1,670
31.....					646	.....	1,350	457	.....	2,680	.....	.....
Maximum.....					1,670	2,150	1,990	1,350	920	2,680	2,680	2,680
Minimum.....					278	457	646	457	379	379	1,100	1,100
Mean.....					546	769	939	743	574	1,145	1,737	1,489

Daily and monthly discharges, in liters per second, of Mantayupan River near Barili, Cebu, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1. . . . .	1,100	1,670	920	546	320	1,990	457	.....	457	320	457	457
2. . . . .	1,920	1,670	920	546	320	1,350	457	.....	457	320	457	457
3. . . . .	1,350	1,350	920	457	320	920	457	.....	457	320	457	457
4. . . . .	920	1,350	646	457	320	920	457	.....	457	320	457	457
5. . . . .	920	1,350	646	457	320	920	457	.....	457	320	457	546
6. . . . .	920	1,350	646	457	320	770	457	.....	457	320	646	457
7. . . . .	920	1,350	646	457	320	770	457	.....	457	320	646	457
8. . . . .	920	1,670	646	457	1,350	770	457	.....	457	320	646	457
9. . . . .	920	1,670	646	457	1,350	646	457	379	457	320	646	457
10. . . . .	920	1,670	646	457	920	646	457	546	457	320	920	379
11. . . . .	920	1,670	646	457	646	646	457	546	457	320	920	379
12. . . . .	920	1,670	646	457	546	546	.....	546	457	320	920	457
13. . . . .	1,350	1,350	646	457	457	546	.....	546	457	920	770	457
14. . . . .	920	920	646	457	457	546	.....	546	457	770	646	457
15. . . . .	2,630	920	646	457	457	457	646	457	457	770	546	457
16. . . . .	2,310	920	646	457	457	457	646	457	457	1,350	546	646
17. . . . .	1,670	920	920	457	457	457	1,100	457	457	1,350	457	646
18. . . . .	1,350	920	646	457	457	457	1,100	457	379	1,350	457	546
19. . . . .	1,350	920	646	457	457	457	1,100	457	379	1,350	457	546
20. . . . .	1,350	920	646	457	457	457	1,100	457	379	1,100	379	546
21. . . . .	1,350	920	646	457	.....	457	1,100	457	320	1,100	379	546
22. . . . .	.....	920	646	457	.....	646	1,100	457	320	920	379	546
23. . . . .	.....	920	646	457	.....	457	1,100	457	320	920	379	546
24. . . . .	.....	920	646	457	.....	457	646	457	320	920	379	546
25. . . . .	.....	920	646	457	3,270	2,630	646	457	320	920	379	646
26. . . . .	.....	920	646	457	457	457	320	457	379	646	457	646
27. . . . .	3,270	920	646	457	1,920	457	278	457	379	546	920	646
28. . . . .	2,630	920	646	457	646	457	278	457	379	.....	920	646
29. . . . .	1,990	920	646	457	646	546	278	457	379	.....	457	546
30. . . . .	1,350	.....	546	457	646	546	278	457	379	2,310	457	546
31. . . . .	1,350	.....	546	.....	646	.....	278	457	.....	379	457	546
Maximum	3,270	1,670	920	546	3,270	1,990	1,100	546	457	2,310	920	920
Minimum	920	646	546	457	320	457	278	379	320	320	379	379
Mean.	1,433	1,196	683	463	771	645	629	468	413	743	554	533

## COTABATO PROVINCE

### AWANG RIVER, AWANG

**LOCATION.**—About 100 m. south of Awang Farm School Dormitory, 8 km. southwest of Cotabato.

**RECORDS AVAILABLE.**—From August 1, 1919, to November 25, 1922.

**GAGE.**—Vertical gage board braced to "Alim" tree on right bank of river.

**DISCHARGE MEASUREMENTS.**—Made by wading at 6.5 m. below gage.

**CHANNEL AND BANKS.**—Channel is straight for about 50 m. above and below the gaging station. Right bank loose and easily eroded; left bank low but of compact earth. At measuring section stream bed permanent but due to erosion of right bank the river channel is becoming wider.

**EXTREMES OF DISCHARGE.**—Maximum discharge recorded during the period of observation, 73,264 second-liters on July 22, 1921; minimum discharge, 668 second-liters on September 3, 1921.

**DIVERSIONS.**—None.

**REGULATION.**—None.

**UTILIZATION.**—For irrigation purposes.

**ACCURACY.**—Daily discharge determined from poorly-defined curves. Applicable from August 1, 1919 to December 31, 1922. Gage read twice daily.

*Discharge measurements of Awang River, near Awang Farm School,  
Awang, Cotabato*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1919</b>				
August 1. . . . .	A. Baldonado and D. Abenes.	1.01	1,874	. . . . .
August 12. . . . .	do. . . . .	.98	1,696	. . . . .
September 6. . . . .	do. . . . .	.97	1,386	. . . . .
October 5. . . . .	do. . . . .	1.12	3,712	. . . . .
October 31. . . . .	D. Abenes. . . . .	.85	3,282	. . . . .
November 1. . . . .	do. . . . .	.81	2,597	. . . . .
December 3. . . . .	do. . . . .	.82	1,585	. . . . .
<b>1920</b>				
January 3. . . . .	do. . . . .	.83	1,817	. . . . .
February 11. . . . .	do. . . . .	.80	1,407	. . . . .
March 12. . . . .	do. . . . .	.81	1,383	. . . . .
April 26. . . . .	do. . . . .	.81	1,508	. . . . .
May 27. . . . .	do. . . . .	.82	1,467	. . . . .
June 24. . . . .	do. . . . .	.93	2,094	. . . . .
August 5. . . . .	do. . . . .	.85	1,616	. . . . .
September 4. . . . .	do. . . . .	.83	1,648	. . . . .
October 4. . . . .	do. . . . .	.80	1,279	. . . . .
October 6. . . . .	do. . . . .	.80	1,270	. . . . .
November 7. . . . .	do. . . . .	.98	2,229	. . . . .
<b>1921</b>				
January 26. . . . .	do. . . . .	1.63	1,258	. . . . .
February 3. . . . .	do. . . . .	1.02	1,017	. . . . .
March 3. . . . .	do. . . . .	1.05	1,917	. . . . .
April 4. . . . .	do. . . . .	1.04	1,522	. . . . .
May 10. . . . .	do. . . . .	1.00	1,259	. . . . .
June 24. . . . .	A. Baldonado. . . . .	1.07	7,085	. . . . .
August 18. . . . .	P. Feliciano. . . . .	1.04	1,977	. . . . .
October 6. . . . .	do. . . . .	1.16	3,704	. . . . .

*Discharge measurements of Awang River, near Awang Farm  
School, Awang, Cotabato—Continued*

Date	Made by—	Gage height (meters)	Discharge (second- liters)	Remarks
<b>1921</b>				
October 7.....	P. Feliciano.....	1.20	4,560	
December 8.....	do.....	1.09	2,287	
December 9.....	do.....	1.08	2,359	
<b>1922</b>				
January 26.....	do.....	1.05	1,580	
January 27.....	do.....	1.07	1,747	
January 28.....	do.....	1.07	1,743	
February 3.....	do.....	1.04	1,473	
February 4.....	do.....	1.04	1,495	
February 5.....	do.....	1.04	1,468	
March 27.....	S. Gonzales.....	1.08	1,465	
March 28.....	do.....	1.04	1,474	
March 28.....	P. Feliciano.....	1.04	1,701	
March 29.....	S. Gonzales.....	1.03	1,434	
April 20.....	do.....	1.03	1,466	
April 21.....	do.....	1.04	1,412	
April 28.....	do.....	1.04	1,476	
April 29.....	do.....	1.03	1,485	
May 23.....	do.....	1.07	1,883	
May 24.....	do.....	1.04	1,423	
May 29.....	do.....	1.03	1,438	
May 30.....	do.....	1.03	1,462	
June 21.....	do.....	1.07	1,923	
June 23.....	do.....	1.04	1,440	
July 20.....	do.....	1.05	1,463	
July 21.....	do.....	1.07	1,995	
August 2.....	do.....	1.06	1,876	
August 3.....	do.....	1.04	1,511	
August 30.....	do.....	1.03+	1,495	
August 31.....	do.....	1.03	1,444	
September 19.....	do.....	1.03+	1,431	
September 20.....	do.....	1.04	1,463	
September 19.....	do.....	1.07	1,999	
September 30.....	do.....	1.06	1,897	
October 16.....	do.....	1.06	1,859	
October 17.....	do.....	1.05	1,490	
October 28.....	do.....	1.03	1,463	
October 29.....	do.....	1.07+	1,929	
November 17.....	do.....	1.09	1,909	
November 29.....	do.....	1.03	1,547	
November 30.....	do.....	1.03	1,810	
December 19.....	do.....	1.03+	1,403	
December 20.....	do.....	1.03	1,407	
December 27.....	do.....	1.03+	1,424	
December 28.....	do.....	1.04	1,506	

*Daily and monthly discharges, in liters per second, of A wang River near Awang Farm School, Awang, Cotobato, for the year 1919*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.	.....	.....	.....	.....	.....	.....	.....	2,520	2,150	4,702	2,065	2,820
2.	.....	.....	.....	.....	.....	.....	.....	2,425	2,150	6,030	3,140	2,820
3.	.....	.....	.....	.....	.....	.....	.....	2,520	2,150	7,384	2,925	2,240
4.	.....	.....	.....	.....	.....	.....	.....	2,520	2,150	9,804	2,825	2,825
5.	.....	.....	.....	.....	.....	.....	.....	2,330	2,150	6,380	3,140	2,520
6.	.....	.....	.....	.....	.....	.....	.....	2,330	2,150	6,380	3,140	2,520
7.	.....	.....	.....	.....	.....	.....	.....	2,330	19,320	22,120	3,486	2,520
8.	.....	.....	.....	.....	.....	.....	.....	2,065	26,040	6,208	13,720	2,240
9.	.....	.....	.....	.....	.....	.....	.....	2,065	5,508	6,208	13,720	2,620
10.	.....	.....	.....	.....	.....	.....	.....	2,065	3,858	6,030	2,925	3,990
11.	.....	.....	.....	.....	.....	.....	.....	2,065	3,990	6,208	2,820	2,820
12.	.....	.....	.....	.....	.....	.....	.....	2,240	31,920	6,394	2,925	3,080
13.	.....	.....	.....	.....	.....	.....	.....	2,240	16,240	6,030	2,820	5,171
14.	.....	.....	.....	.....	.....	.....	.....	2,150	3,030	6,380	2,820	9,776
15.	.....	.....	.....	.....	.....	.....	.....	2,150	2,240	7,384	2,820	9,776
16.	.....	.....	.....	.....	.....	.....	.....	2,150	2,240	7,384	2,820	9,776
17.	.....	.....	.....	.....	.....	.....	.....	2,150	2,150	7,384	2,820	9,776
18.	.....	.....	.....	.....	.....	.....	.....	2,150	2,150	7,384	2,820	9,776
19.	.....	.....	.....	.....	.....	.....	.....	5,680	2,150	6,394	3,030	2,330
20.	.....	.....	.....	.....	.....	.....	.....	2,925	2,150	6,208	2,820	2,330
21.	.....	.....	.....	.....	.....	.....	.....	2,520	2,150	5,852	2,820	2,720
22.	.....	.....	.....	.....	.....	.....	.....	2,520	2,150	6,376	2,820	2,425
23.	.....	.....	.....	.....	.....	.....	.....	2,520	2,150	4,384	3,140	2,330
24.	.....	.....	.....	.....	.....	.....	.....	2,520	2,150	7,384	2,720	2,330
25.	.....	.....	.....	.....	.....	.....	.....	2,150	2,150	5,176	2,620	2,330
26.	.....	.....	.....	.....	.....	.....	.....	2,150	2,150	4,360	3,486	2,330
27.	.....	.....	.....	.....	.....	.....	.....	2,150	2,240	5,852	2,925	2,330
28.	.....	.....	.....	.....	.....	.....	.....	2,240	2,425	3,858	2,820	2,330
29.	.....	.....	.....	.....	.....	.....	.....	2,150	3,030	3,140	2,620	2,330
30.	.....	.....	.....	.....	.....	.....	.....	2,150	.....	.....	.....	2,425
31.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maximum.....	.....	.....	.....	.....	.....	.....	.....	5,680	31,920	22,120	13,720	6,976
Minimum.....	.....	.....	.....	.....	.....	.....	.....	2,394	1,520	2,620	2,065	2,240
Mean.....	.....	.....	.....	.....	.....	.....	.....	2,394	5,323	6,372	3,645	2,545

*Daily and monthly discharges, in liters per second, of Awang River near Awang Farm School, Awang, Cotabato, for the year 1920*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.	2,330	2,425	2,150	2,240	904	1,026	1,294	19,600	1,294	1,434	.....	1,224
2.	2,330	2,240	2,150	2,240	962	1,026	1,154	14,280	1,294	1,294	.....	1,224
3.	2,330	2,240	2,150	2,240	962	1,114	1,740	7,604	1,294	1,224	.....	1,154
4.	2,425	2,240	2,150	2,240	962	1,154	1,580	6,208	904	1,026	.....	1,154
5.	2,720	2,240	2,150	2,240	962	1,224	1,740	1,224	904	904	.....	1,154
6.	3,990	2,240	2,150	2,150	962	1,026	10,080	1,580	904	962	.....	1,224
7.	4,552	2,330	2,150	2,150	1,154	1,026	1,294	1,580	904	1,026	.....	1,224
8.	4,860	2,330	2,150	2,150	1,154	1,026	10,080	1,364	864	1,026	.....	1,294
9.	3,606	2,330	2,150	2,150	1,026	962	23,800	1,364	864	1,580	.....	1,294
10.	2,330	2,240	2,150	2,150	1,026	962	9,280	1,740	904	1,580	.....	1,294
11.	2,330	2,150	2,150	2,150	1,026	904	3,888	1,400	904	2,825	.....	1,224
12.	2,330	2,150	2,150	2,150	1,026	904	6,804	1,294	1,026	1,880	.....	1,154
13.	2,330	2,240	2,150	2,150	1,026	904	9,804	1,294	1,026	19,880	.....	1,154
14.	2,330	2,240	2,150	2,150	1,026	904	20,160	1,294	1,026	25,480	.....	1,294
15.	2,330	2,425	2,150	2,150	1,090	3,486	8,280	1,294	1,294	25,480	.....	1,294
16.	2,330	2,425	2,150	2,150	1,026	1,294	1,154	1,090	1,294	25,480	.....	1,224
17.	2,330	3,990	2,520	2,240	962	1,154	1,962	1,090	1,154	23,280	.....	1,294
18.	2,240	2,425	2,425	2,240	962	1,090	1,026	1,154	1,154	23,280	.....	1,294
19.	2,240	2,425	2,240	2,240	962	1,026	1,224	1,154	1,090	23,280	.....	1,294
20.	2,620	2,240	2,240	2,240	962	962	1,224	1,294	1,224	.....	.....	1,154
21.	2,240	2,425	2,240	2,240	962	1,026	1,154	1,294	2,150	.....	.....	1,154
22.	2,240	2,240	2,240	2,240	1,026	1,026	1,224	1,294	2,150	.....	.....	1,154
23.	2,240	2,240	2,240	2,240	1,026	962	1,224	1,294	2,425	.....	.....	1,154
24.	2,240	2,150	2,150	2,240	1,026	1,434	1,294	1,434	2,425	.....	.....	1,154
25.	2,240	2,150	2,150	1,026	962	1,154	1,154	1,364	2,425	.....	.....	1,154
26.	2,625	2,150	2,150	1,026	962	1,026	1,294	1,154	2,150	.....	.....	1,154
27.	2,820	2,150	2,150	1,026	1,026	1,026	1,364	1,154	2,150	.....	.....	1,154
28.	2,330	2,150	2,150	962	962	1,090	20,440	1,434	1,580	.....	.....	1,154
29.	2,330	2,150	2,150	962	1,026	1,294	19,600	1,434	1,580	.....	.....	1,154
30.	2,240	.....	2,150	962	1,026	.....	19,600	1,364	1,504	.....	.....	1,154
31.	2,240	.....	2,240	.....	1,026	.....	19,600	1,364	.....	.....	.....	1,154
Maximum.	4,860	3,990	2,925	2,240	1,154	3,486	23,800	19,600	2,425	28,280	1,364	1,294
Minimum ..	2,240	2,150	2,150	962	904	904	962	1,090	846	904	1,026	1,026
Mean ...	2,605	2,337	2,229	1,961	1,001	1,195	5,952	2,705	1,409	10,553	1,246	1,199

NOTE.—Gage damaged during period of no record.

Daily and monthly discharges, in liters per second, of Awang River near Poblacion, Awang, Cotabato, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	1,154	1,540	2,340	1,540		1,018	1,540	1,867	1,004	2,656	2,365	2,232
2	1,224	1,252	1,914	1,540		1,252	2,340	1,867	716	2,365	2,365	2,232
3	1,224	1,018	1,914	1,540		836	1,914	17,610	688	2,365	2,656	2,232
4	1,224	1,252	2,340	1,540		686	2,340	5,260	1,300	1,658	2,365	2,656
5	1,224	1,018	2,340	1,540		686	1,540	1,867	940	1,146	2,365	2,365
6	1,294	1,018	1,914	1,540		836	1,540	1,867	766	878	3,684	2,232
7	1,294	1,018	1,914	1,252		1,018	1,540	1,867	1,300	822	3,497	2,232
8	1,224	1,252	1,540	1,252		1,336	2,340	1,867	1,300	822	3,497	2,232
9	1,224	1,252	2,340	1,252		1,336	2,340	1,867	1,382	822	3,497	2,232
10	1,154	1,540	2,340	1,252		1,336	1,540	1,867	1,382	822	3,497	2,232
11	1,154	1,540	1,914	1,018		1,018	1,540	1,867	1,558	3,320	2,505	2,102
12	1,154	1,540	1,914	1,018		1,018	2,336	1,867	1,223	2,978	3,145	2,102
13	1,154	1,540	2,340	1,018		1,018	1,540	1,867	1,146	2,656	2,505	2,102
14	1,154	1,540	2,340	1,018		1,540	1,540	1,867	1,004	2,365	2,978	2,102
15	1,090	1,252	3,412	1,018		836	1,540	1,760	878	2,365	3,877	1,980
16	1,090	1,018	2,340	1,540		686	4,864	1,658	878	2,365	3,877	1,980
17	1,090	1,018	2,340	1,540		686	8,664	1,658	878	2,365	4,080	2,102
18	1,018	1,252	2,340	1,540		686	54,264	1,658	878	2,365	3,320	1,980
19	1,540	1,540	2,340	1,252		686	54,264	1,658	822	2,332	2,365	1,980
20	1,540	1,540	1,914	1,018		686	32,264	1,867	822	2,332	2,365	1,980
21	1,540	2,340	2,340	836		686	73,264	1,562	878	2,332	2,365	2,365
22	1,540	2,340	2,340	836	686	686	10,680	1,562	878	2,365	2,365	1,775
23	1,540	2,340	2,340	836	686	686	18,360	1,867	878	2,656	2,332	1,925
24	1,252	1,914	2,340	1,018	686	2,340	1,867	18,360	822	2,365	2,232	1,775
25	1,252	2,340	1,914	1,018	686	1,540	2,102	4,080	878	2,365	2,232	1,775
26	1,540	2,340	1,540	1,018	4,864	1,540	1,867	1,867	6,740	2,365	2,232	1,633
27	1,540	1,914	1,540	1,018	836	3,412	1,867	878	3,684	2,232	2,656	1,775
28	1,540	1,914	1,540	1,018	686	1,914	1,867	716	34,100	2,232	2,365	1,506
29	1,252	1,252	1,914	836	1,018	1,252	1,867	1,470	10,630	2,365	2,365	1,506
30	1,252	1,252	2,340	836	686	1,914	1,867	1,470	12,620	2,365	2,232	1,506
31	1,540	2,340	2,340	836	686	1,914	1,867	2,656	3,320	3,320	4,080	3,320
Maximum	2,340	2,340	3,412	1,540	4,864	3,412	73,264	18,360	34,100	3,497	4,080	4,080
Minimum	1,018	1,018	1,540	836	686	686	1,540	716	688	2,332	2,232	1,506
Mean	1,302	1,524	2,143	1,169	1,152	1,128	9,191	3,005	3,155	2,354	2,781	2,068

NOTE.—No record on days for which discharge is not given.

Daily and monthly discharges, in liters per second, of Awang River near Poblacion, Awang, Cotabato, for the year 1922

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	1,775	1,775	1,506	1,404	1,404	1,404	2,486	2,281	1,404	6,302	1,506	.....
2.....	1,506	1,775	1,506	1,404	1,320	1,404	1,775	1,775	1,404	2,486	1,404	.....
3.....	1,775	1,506	1,506	1,404	1,404	1,404	2,231	1,633	1,506	1,925	1,404	.....
4.....	1,506	1,506	1,404	1,404	1,404	1,404	2,231	1,775	1,404	1,633	1,404	.....
5.....	1,506	1,506	1,506	1,404	1,404	1,506	1,775	1,775	1,775	1,506	1,404	.....
6.....	1,506	1,506	1,506	1,404	1,404	1,506	6,582	1,506	1,506	1,506	1,404	.....
7.....	1,506	1,506	1,506	1,320	1,404	1,506	1,775	1,506	1,506	2,095	1,320	.....
8.....	1,506	1,506	1,506	1,320	1,404	1,506	2,095	1,506	10,782	1,925	1,320	.....
9.....	1,506	1,506	1,506	1,404	1,404	1,506	2,095	7,982	2,486	1,925	1,320	.....
10.....	1,506	1,506	1,506	1,404	1,404	1,404	3,502	2,982	1,775	3,782	1,775	.....
11.....	1,506	1,506	1,506	1,404	1,404	1,404	2,231	1,775	1,775	3,502	1,506	.....
12.....	1,506	1,506	1,506	1,404	1,404	1,404	1,775	1,775	1,775	2,095	1,320	.....
13.....	1,775	1,506	1,404	1,404	1,404	1,404	1,775	2,281	1,633	1,925	2,713	.....
14.....	1,775	1,506	1,506	1,404	1,404	1,633	2,095	2,486	1,404	1,633	15,822	.....
15.....	1,775	1,506	1,404	1,404	1,404	1,633	1,775	3,782	1,404	1,775	2,502	.....
16.....	1,775	1,506	1,506	1,404	1,404	1,925	1,775	3,502	1,404	1,506	3,222	.....
17.....	1,506	1,404	1,506	1,320	1,404	1,775	2,095	2,281	1,404	1,775	11,902	.....
18.....	1,775	1,320	1,404	1,404	1,404	10,222	2,095	2,281	1,404	1,775	6,582	.....
19.....	1,775	1,320	1,506	1,506	1,404	6,302	2,095	1,775	1,404	1,506	2,962	.....
20.....	1,775	1,404	1,404	1,506	1,404	4,622	3,782	1,775	1,404	1,506	2,095	.....
21.....	1,775	1,404	1,404	1,506	4,902	2,486	2,486	1,506	1,404	1,633	1,775	.....
22.....	1,633	1,320	1,404	1,506	2,095	1,775	1,775	1,506	1,506	1,404	1,633	.....
23.....	1,775	1,506	1,404	1,404	1,506	1,775	2,095	1,506	1,404	1,404	1,506	.....
24.....	1,633	1,404	1,404	1,775	1,404	1,775	2,095	1,506	1,404	1,404	1,506	.....
25.....	1,775	1,506	1,404	1,404	1,404	2,982	9,102	1,506	2,095	1,404	.....	.....
26.....	1,775	1,775	1,404	1,404	1,404	1,775	4,062	1,404	4,622	1,404	.....	.....
27.....	1,775	1,506	1,404	1,404	1,404	2,982	2,982	1,404	6,582	6,582	.....	.....
28.....	1,775	1,506	1,506	1,506	1,404	1,775	2,231	1,404	2,486	2,962	.....	.....
29.....	1,506	.....	1,404	1,404	1,404	1,775	2,231	1,404	6,302	1,775	.....	.....
30.....	1,775	.....	1,404	1,320	1,404	1,775	2,095	1,404	.....	1,633	.....	.....
31.....	1,633	.....	1,404	.....	1,404	.....	2,095	1,404	.....	.....	.....	.....
Maximum	1,775	1,775	1,506	1,925	4,902	10,222	9,102	7,982	10,782	6,582	15,822	.....
Minimum	1,506	1,320	1,453	1,320	1,320	1,404	1,775	1,404	2,340	1,404	1,320	.....
Mean	1,670	1,514	1,453	1,466	1,540	2,268	2,877	2,076	2,340	2,146	2,913	.....



## COTABATO PROVINCE

## KABAKAN RIVER, KABAKAN

LOCATION.—On the Kabakan—Kidapauan trail, at about 70 m. south of the house of the manager of Rio Grande Rubber Estate, and about 200 m. above the confluence of this river with the Pulangui River.

RECORDS AVAILABLE.—From August 29, 1919, to August 7, 1921.

GAGE.—Inclined staff nailed and wired to wooden posts at left banks of river.

DISCHARGE MEASUREMENTS.—Made by wading at section of gage.

CHANNEL AND BANKS.—Channel straight for 100 m. above and 200 m. below the gaging section. Right bank bare, subject to overflow; left bank thickly covered with "talahib" seldom overflowed and not much eroded. Stream bed shifting, being of fine sand.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during the period of observation, 158,950 second-liters on October 1, 1919; minimum discharge, 9,300 second-liters scattered about in March, April, and May, 1920.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge determined from a fairly well-defined curve. The station is a poor one due to the effect of Pulangui River. Gage read twice daily.

*Discharge measurements of Kabacan River, near Rio Grande Rubber Estate, Kabacan, Cotabato*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1919</b>				
August 30..	A. Baldonado and D. Abenes.	1 20	28,611	
September 24 ..	do	1 61	28,401	
October 17..	do	2 11	49,957	
November 26..	do.	1 89	38,198	
December 22	do	1 38	22,170	
<b>1920</b>				
January 31..	D. Abenes.	1 31	18,774	
March 1	do	1 25	17,826	
April 4..	do	1 32	24,071	
May 8..	do.	1 47	24,000	
June 11 ..	do.	1 68	21,227	
July 16	do.	1 37	22,533	
August 22	do	1 82	23,540	
September 16 ..	do.	2 17	69,641	
October 12.....	do...	3 82	155,714	
November 26..	do	1 40	24,614	
<b>1921</b>				
January 19 ..	do.	1 50	28,212	
February 21 ..	do.	1 40	23,966	
March 16 ..	do.	2 33	50,237	
May 31 ..	do	2 10	43,793	



*Daily and monthly discharges, in liters per second, of Kabakan River near Rio Grande Rubber Estate, Kabakan, Cotabato, for the year 1920*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.	17,600	19,700	18,300	13,050	11,100	27,225	73,450	17,600	21,100	26,100	34,350	25,350
2.	17,950	19,000	15,975	11,750	9,600	54,300	61,125	30,975	18,300	23,200	31,725	28,350
3.	23,200	16,625	16,300	11,100	9,300	56,100	65,550	20,400	22,150	23,200	37,100	27,975
4.	17,550	15,650	16,300	13,700	9,900	31,725	57,900	15,975	20,750	26,850	37,100	63,750
5.	127,600	15,325	15,325	16,300	9,300	21,800	47,725	21,800	19,000	38,300	55,200	63,300
6.	102,800	15,000	15,650	17,200	9,300	24,975	52,350	21,800	17,200	37,850	40,700	32,325
7.	63,500	44,750	15,000	17,200	19,350	39,100	52,350	19,350	26,850	57,900	43,500	32,325
8.	61,500	44,750	15,000	16,300	19,350	39,100	54,300	19,350	26,850	57,900	43,500	55,100
9.	51,550	29,450	13,350	17,275	38,300	68,700	49,000	16,300	26,850	97,200	58,100	118,100
10.	38,300	21,450	13,700	16,300	29,850	53,400	39,100	15,325	26,100	115,725	57,000	178,200
11.	32,100	19,000	13,050	14,025	34,350	36,300	41,500	15,000	20,750	129,025	33,500	73,300
12.	36,300	19,000	11,750	13,375	32,850	32,550	35,900	20,400	20,750	130,450	33,600	39,100
13.	40,700	26,100	11,750	14,350	23,900	22,150	33,225	20,400	16,950	145,175	36,700	35,900
14.	33,225	19,000	11,100	13,050	27,975	24,250	27,600	26,850	22,150	145,175	30,600	37,500
15.	29,850	20,400	11,100	11,750	39,100	32,100	23,900	33,975	46,875	96,250	27,225	35,900
16.	24,975	32,850	15,000	10,200	29,850	25,725	21,800	33,975	53,400	84,850	26,850	29,850
17.	22,150	29,100	14,350	13,700	25,350	21,800	31,350	28,350	46,025	66,550	23,900	24,975
18.	21,800	26,850	11,750	12,075	23,200	19,000	35,175	38,300	59,700	58,350	23,900	23,200
19.	16,850	20,750	10,800	11,400	23,550	18,560	33,600	35,650	37,400	43,500	23,900	25,325
20.	23,500	18,300	11,750	11,400	19,350	29,350	33,600	31,350	32,100	43,500	23,900	23,500
21.	23,100	18,300	11,750	11,400	41,500	29,350	21,450	41,500	62,100	54,800	26,100	28,850
22.	38,300	19,700	10,800	12,400	48,575	39,100	20,050	40,700	59,700	50,700	26,100	21,800
23.	38,300	19,700	10,800	11,100	38,300	39,100	20,050	39,500	55,200	44,750	35,100	20,050
24.	66,900	24,600	9,900	9,300	21,800	72,500	18,650	35,500	62,500	41,500	35,100	19,000
25.	35,900	25,350	9,900	9,300	19,700	48,575	16,300	39,100	69,650	33,975	28,350	18,650
26.	29,100	21,100	9,300	9,300	22,500	39,900	15,650	31,350	45,600	51,651	28,350	18,650
27.	24,250	33,225	9,900	13,700	25,350	39,100	15,000	36,700	36,700	73,925	26,100	16,300
28.	26,475	31,725	9,600	12,400	23,900	58,800	17,600	36,700	33,975	46,025	37,500	16,650
29.	23,200	21,100	9,300	9,300	21,975	31,350	15,000	29,100	33,600	39,900	31,725	56,100
30.	22,850	21,100	9,600	9,300	24,975	35,500	13,375	29,475	27,975	52,075	28,350	40,700
31.	19,700	..	..	..	17,500	..	13,050	25,850	..	..	..	24,250
Maximum	127,600	44,750	18,300	26,850	48,575	72,500	73,450	61,500	69,650	145,175	71,550	118,100
Minimum	15,000	15,000	9,300	9,300	9,300	15,300	13,050	15,000	15,950	23,200	23,900	16,300
Mean	38,719	23,571	12,324	13,157	24,633	35,634	34,057	29,668	35,909	64,707	35,651	37,500

*Daily and monthly discharges, in liters per second, of Kabakan River near Rio Grande Rubber Estate, Kabakan, Cotabato, for the year 1921*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	21,800	17,950	38,300	20,750	94,350	45,600	45,600	64,200				
2	20,050	15,975	36,100	20,400	64,200	40,700	55,650	62,400				
3	23,550	15,550	35,225	19,700	61,500	60,600	68,450	68,700				
4	29,100	16,300	32,325	18,300	73,875	102,425	102,425	97,575				
5	32,850	17,600	22,350	17,300	68,400	101,975	64,500	88,800				
6	25,350	16,300	22,150	17,600	69,600	98,400	49,425	88,800				
7	20,750	15,975	27,600	24,975	69,600	138,300	41,500	79,625				
8	29,850	15,650	33,600	22,500	41,500	113,400	50,275					
9	28,725	15,000	29,475	16,625	25,850	103,850	60,600					
10	21,800	15,650	50,700	15,975	23,900	88,750	44,750					
11	24,600	41,500	124,750	19,350	25,350	68,450	65,650					
12	13,050	24,250	139,000	24,600	31,725	79,150	70,125					
13	30,600	15,650	133,300	29,850	39,500	106,700	77,250					
14	27,975	15,000	79,150	24,250	38,300	118,100	75,350					
15	39,500	14,350	62,950	19,350	71,550	116,200	75,350					
16	27,600	16,950	63,300	18,650	140,900	126,175	83,425					
17	26,850	27,600	60,600	15,975	156,100	137,100	77,250					
18	30,225	23,900	68,700	15,325	150,375	111,925	112,400					
19	23,900	20,050	90,550	15,000	129,500	129,500	118,100					
20	24,250	20,750	97,200	16,950	112,400	90,550	75,825					
21	24,975	25,725	64,200	19,000	76,300	123,325	75,825					
22	22,500	27,600	65,100	21,800	48,150	103,275	61,950					
23	23,550	29,850	24,325	20,400	49,425	118,575	49,000					
24	19,350	39,100	35,500	19,000	42,300	111,150	45,600					
25	32,500	29,850	38,850	15,650	65,100	111,450	45,175					
26	13,000	61,500	38,300	15,650	41,500	86,750	61,500					
27	17,000	58,350	23,475	16,000	40,700	83,325	72,975					
28	38,300	41,100	26,100	68,700	38,700	71,550	116,250					
29	19,700	.....	24,975	106,700	47,800	82,000	69,650					
30	17,950	.....	24,900	102,575	69,650	57,900	68,700					
31	16,300	.....	21,800	102,575	69,650	.....	67,350					
Maximum	39,500	61,500	139,000	106,700	156,100	137,100	118,100	97,675				
Minimum	13,050	14,350	21,800	15,000	23,900	40,700	41,500	62,400				
Mean	24,048	25,635	52,980	26,710	66,535	94,913	67,973	79,507				

## COTABATO PROVINCE

## KATINGAUAN RIVER, BUAL

**LOCATION.**—About 2 km. north of the Bual Farm School. On north side of trail leading from Bual to Libungan.

**RECORDS AVAILABLE.**—From August 19, 1919, to August 10, 1921.

**GAGE.**—Gage board of lauan graduated every 2 cm. with nails fastened vertically to "upak" tree at left bank of river.

**DISCHARGE MEASUREMENTS.**—Made by wading at section of gage.

**CHANNEL AND BANKS.**—Channel only one at all stages; straight for 20 m. above and 50 m. below gaging station. Both banks of soft earth, heavily covered with cogon grass, and subject to overflow. Inaccessible during floods.

**EXTREMES OF DISCHARGE.**—Maximum discharge during period of observation, over 2,593 second-liters on May 20, 1921; minimum discharge, 8 second-liters on February 9, 1921.

**DIVERSIONS.**—None.

**REGULATION.**—None.

**UTILIZATION.**—For irrigation purposes.

**ACCURACY.**—Exact flood height cannot be determined due to non-extension of gage. Daily discharge determined from a fairly well-defined curve from 45 to 220 second-liters. Gage read twice daily.

*Discharge measurements of Katingawan River, near Bual Farm School, Bual, Cotabato*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1919</b>				
August 19 ..	A. Baldonado and D. Abenes.	80	160	
September 30....	.. do.	1 08	404	
October 27 ..	.. do.	1 035	391	
November 17..	.. do.	92	282	
December 27 ..	.. do.	80	129	
<b>1920</b>				
January 21 ..	D. Abenes	88	221	
February 23 ..	.. do.	.99	265	
March 25 ..	.. do.	.77	123	
April 17....	.. do.	.75	88	
May 17....	.. do.	.67	36	
June 14....	.. do.	.71	67	
July 11....	.. do.	.84	192	
August 9....	.. do.	.69	54	
September 25....	.. do.	.92	355	
October 21....	.. do.	1.25	624	
November 22....	.. do.	.82	186	
December 9. ....	.. do.	85	217	
<b>1921</b>				
January 8 .....	.. do.	.79	108	
February 10....	.. do.	1 24	584	
March 24....	.. do.	1 05	421	
April 13....	.. do.	.78	114	

*Daily and monthly discharges, in liters per second, of Katingawan River near Bual Farm School, Bual, Cotabato, for the year 1919*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1...									84	368	1,189	409
2									84	288	1,072	378
3									68	388	1,176	308
4									68	453	1,564	228
5									68	348	348	208
6									68	368	431	189
7									84	1,852	453	171
8									208	2,087	624	153
9									1,171	1,058	624	153
10									238	1,058	588	378
11									799	1,956	588	409
12									...	541	541	388
13									...	464	464	968
14									1,579	1,137	431	660
15									388	812	358	486
16									348	431	268	409
17									388	308	268	308
18									431	308	248	268
19								171	176	238	218	228
20								457	378	218	228	218
21								308	308	188	308	218
22								388	248	308	308	218
23								278	208	278	208	208
24								208	189	208	248	171
25								153	171	208	228	162
26								135	238	208	153	163
27								117	296	388	198	144
28								117	600	228	171	153
29								108	497	1,917	162	153
30								100	175	1,267	144	144
31								100	175	1,774	453	135
Maximum...								588	1,579	2,086	1,189	968
Minimum...								200	308	709	168	186
Mean...								224	308	709	444	281

NOTE.—Probable discharge on September 12 and 13 is 2,680 second-liters as adjusted from the curve for a gage height of 3.00 as was supposed by the Hydrographer in charge.

*Daily and monthly discharges, in liters per second, of Katingawan River near Bual Farm School, Bual, Cotabato, for the year 1920*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	135	308	308	92	68	60	276	238	144	248	278	135
2	135	171	189	92	60	60	238	238	144	218	248	135
3	135	144	268	84	258	92	654	228	162	162	218	135
4	153	189	171	76	258	60	612	218	180	903	162	135
5	348	171	171	76	208	60	476	198	162	358	358	144
6	334	158	158	484	176	348	338	198	162	258	298	144
7	634	184	184	358	176	348	338	198	162	258	298	144
8	175	1, 826	153	189	60	92	378	144	162	198	258	126
9	442	2, 008	153	180	60	68	358	52	153	338	198	100
10		1, 267	153	126	60	44	358	60	162	258	338	162
11	636	368	135	198	198		348	60	238	238	258	162
12	497	328	135	258	92		318	60	218	464	238	144
13		268	126	298			298	60	218	612	464	144
14	564	218	117	180		60	238	52	198	398	612	420
15	422	228	117	144			238	44	218	278	388	576
16	348	2, 060	298	108		258	238	36	218	278	278	358
17	368	737	153	92	29	52	358	36	278	348	298	358
18	388	696	144	92	29	60	358	29	278	348	298	358
19	378	831	144	92	29	60	358	29	278	348	298	358
20	378	831	144	92	29	60	358	29	278	348	298	358
21	238	368	144	76	29	68	278	29	278	606	228	144
22	238	368	144	76	29	68	278	29	278	606	228	144
23	208	328	117	76	29	92	708	68	278	612	198	144
24	162	303	117	84	22	144	278	68	268	278	162	162
25	189	278	117	76	22	144	248	60	268	825	162	180
26	431	268	117	60	60	135	238	60	268	612	162	144
27	328	368	108	60	44	108	180	92	258	485	218	144
28	258	268	92	76	52	162	180	100	258	497	180	144
29	453	328	84	76	29	144	144	117	248	378	153	144
30	453	328	100	76	29	144	144	100	258	318	144	162
31	348	...	100	76	29	162	258	144	258	180	135	162
Maximum	734	2, 060	308	497	258	258	708	238	278	903	903	576
Minimum	135	84	84	60	22	36	144	22	144	162	135	100
Mean	518	513	151	133	71	97	324	104	221	387	272	181

NOTE.—No records of gage heights on days for which no discharges are given.

*Daily and monthly discharges, in liters per second, of Katingawan River near Bual Farm School, Bual, Cotabato, for the year 1921*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	144	298	126			218	278	208				
2	144	258	117			278	338	218				
3	144	258	108			278	258	208				
4	153	258	100			278	218	198				
5	153	228	162		208	2,476	218	180				
6	144	144	144		198	1,332	218	352				
7	135	92	142		198	1	198	352				
8	135	15	153		189	1	180	352				
9	126	8	180		189	672	180	352				
10	135	22	198		198	486	180	378				
11	135	60	180		198	420	180					
12	126	68	162		198	368	180					
13	126	153	144		198	318	208					
14	117	153	144		955	278	198					
15	117	144	144		171	278	180					
16	108	144	144		248	258	171					
17	198	171	135		298	218	218					
18	338	258	126		1,605	368	198					
19	338	258	108		2,242	409	198					
20	238	238	108		2,893	431	708					
21	171	162	108		1,085	398	1,046					
22	171	162	108		576	475	576					
23	318	144	290		559	1,449	564					
24	144	108	358		453	1,189	318					
25	238	92	358		453	378	238					
26	218	75	318		420	328	378					
27	318	60	298		398	298	660					
28	228	60	298		398	298	660					
29	278	278	278		890	258	721					
30	318	278	258		1,345	218	358					
31	278	278	258		1,241	218	308					
Maximum.	541	298	358		2,593	2,476	1,046	696				
Minimum	108	8	100		171	208	162	180				
Mean	204	147	186		660	555	349	354				

NOTE.—No record on days for which discharge is not given.



## COTABATO PROVINCE

## LIBUNGAN RIVER, LIBUNGAN

LOCATION.—Directly on trail toward the river. Station is about 4 km. northeast of Katingawan River gaging station.

RECORDS AVAILABLE.—From September 28, 1919, to July 16, 1921.

GAGE.—Inclined staffs set at the left bank of the river.

DISCHARGE MEASUREMENTS.—Made from raft at ordinary water; by wading at low water.

CHANNEL AND BANKS.—Channel only one at all stages; straight for 100 m. above and for 60 m. below the station. Right bank low subject to overflow, sandy and covered with "talahib;" left bank high and wooded. Stream bed sandy and very shifting. Flow uniform.

EXTREMES OF DISCHARGE.—Maximum discharge during period of observation, 219,910 second-liters on October 16, 1920; minimum discharge, 8,380 second-liters on June 2, 1920.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge determined from a well-defined curve from 11,000 to 28,000 second-liters. Applicable throughout the period of observation. Station is a good one. Gage read twice daily.

*Discharge measurements of Libungan River, near Bual Farm School, Libungan, Cotabato*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1919</b>				
October 26..	A. Baldonado and D. Abenes.	3 25	39,985	.. ..
October 27..	.. do. ....	3 075	34,527	.. ..
November 18 ..	.. do. ....	3.035	27,803	.. ..
December 28 ..	D. Abenes. ....	2 84	22,447	.. ..
<b>1920</b>				
January 22.....	D. Abenes. ....	2.59	14,121	.. ..
February 23.....	.. do. ....	2.59	14,601	.. ..
March 25.....	.. do. ....	2 44	8,299	.. ..
May 16.....	.. do. ....	2.43	8,187	.. ..
June 15.....	.. do. ....	2.84	21,196	.. ..
July 10.....	.. do. ....	2 62	15,120	.. ..
July 2.....	.. do. ....	2.55	12,083	.. ..
August 10.....	.. do. ....	2 42	9,108	.. ..
August 27.....	.. do. ....	2.54	12,831	.. ..
September 25....	.. do. ....	2 87	25,483	.. ..
October 20.....	.. do. ....	3.91	81,850	.. ..
November 22....	.. do. ....	2 88	24,705	.. ..
December 10 ..	.. do. ....	2 82	19,569	.. ..
December 19 ..	.. do. ....	2 92	25,525	.. ..
<b>1921</b>				
January 9.....	.. do. ....	2.60	12,869	.. ..
February 9.....	.. do. ....	2.57	11,907	.. ..
March 23.....	.. do. ....	3.38	45,607	.. ..
April 14.....	.. do. ....	2 80	18,636	.. ..
May 12.....	.. do. ....	2.88	24,906	.. ..

*Daily and monthly discharges, in liters per second, of Libungan River near Bual Farm School, Libungan, Cotabato, for the year 1919*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.	..	..	..	..	..	..	..	..	..	38,690	28,170	22,980
2.	..	..	..	..	..	..	..	..	..	33,590	32,670	22,360
3.	..	..	..	..	..	..	..	..	..	45,490	32,910	21,740
4.	..	..	..	..	..	..	..	..	..	28,500	31,650	21,740
5.	..	..	..	..	..	..	..	..	..	72,690	26,190	22,360
6.	..	..	..	..	..	..	..	..	..	77,790	26,210	19,890
7.	..	..	..	..	..	..	..	..	..	46,610	27,610	19,890
8.	..	..	..	..	..	..	..	..	..	53,990	24,890	19,290
9.	..	..	..	..	..	..	..	..	..	30,190	22,980	19,590
10.	..	..	..	..	..	..	..	..	..	58,750	21,740	27,510
11.	..	..	..	..	..	..	..	..	..	54,670	19,290	27,510
12.	..	..	..	..	..	..	..	..	..	49,230	17,790	37,670
13.	..	..	..	..	..	..	..	..	..	45,490	17,190	32,910
14.	..	..	..	..	..	..	..	..	..	35,290	16,290	29,860
15.	..	..	..	..	..	..	..	..	..	29,610	31,650	32,910
16.	..	..	..	..	..	..	..	..	..	42,090	30,190	29,860
17.	..	..	..	..	..	..	..	..	..	42,090	23,170	23,510
18.	..	..	..	..	..	..	..	..	..	30,870	26,860	22,360
19.	..	..	..	..	..	..	..	..	..	57,310	27,610	21,740
20.	..	..	..	..	..	..	..	..	..	45,150	27,610	22,670
21.	..	..	..	..	..	..	..	..	..	47,670	30,890	20,190
22.	..	..	..	..	..	..	..	..	..	39,370	24,950	18,680
23.	..	..	..	..	..	..	..	..	..	30,370	23,290	16,980
24.	..	..	..	..	..	..	..	..	..	31,270	26,190	17,480
25.	..	..	..	..	..	..	..	..	..	34,270	26,190	18,090
26.	..	..	..	..	..	..	..	..	..	33,930	24,890	20,740
27.	..	..	..	..	..	..	..	..	..	34,950	23,610	20,590
28.	..	..	..	..	..	..	..	..	59,090	33,250	20,590	18,390
29.	..	..	..	..	..	..	..	..	33,250	30,190	25,860	18,390
30.	..	..	..	..	..	..	..	..	69,630	48,890	24,250	17,480
31.	..	..	..	..	..	..	..	..	32,910	32,910	15,980	15,980
Maximum	..	..	..	..	..	..	..	..	69,630	77,790	32,910	37,670
Minimum	..	..	..	..	..	..	..	..	33,250	28,500	16,290	15,980
Mean	..	..	..	..	..	..	..	..	53,990	42,482	25,678	22,564

*Daily and monthly discharges, in liters per second, of Libungan River near Bual Farm School, Bual, Cotabato, for the year 1920*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	17,490	13,360	12,240	11,680	10,000	10,560	11,680	48,210	32,910	27,840	24,890	24,890
2.....	17,490	12,520	11,960	10,560	8,380	8,380	75,070	48,550	28,500	26,190	24,890	26,850
3.....	16,290	11,680	11,680	10,280	.....	18,690	16,990	44,470	22,980	26,850	22,980	22,980
4.....	18,090	13,940	11,680	10,280	12,800	16,290	24,250	47,870	22,050	22,750	29,170	29,170
5.....	16,890	12,800	11,400	10,280	12,240	14,520	22,980	47,190	22,360	47,870	52,530	52,530
6.....	14,810	.....	11,400	15,690	11,680	12,520	20,500	46,510	22,670	20,190	45,830	45,830
7.....	.....	.....	.....	12,800	11,120	13,360	18,390	42,430	22,980	34,270	41,070	41,070
8.....	19,290	25,530	11,120	11,400	11,680	15,690	17,490	41,750	22,980	33,250	32,910	32,910
9.....	22,360	22,360	11,680	12,240	10,560	13,360	16,890	34,270	22,670	37,670	29,510	29,510
10.....	20,810	21,430	10,840	12,240	11,680	13,360	15,100	24,890	31,210	29,510	15,690	21,120
11.....	19,890	21,120	10,840	12,240	11,680	14,810	18,090	26,190	34,950	28,830	14,810	20,560
12.....	20,500	.....	10,840	11,120	10,560	.....	16,890	25,860	32,230	29,850	26,190	20,560
13.....	.....	.....	10,840	13,360	11,680	.....	29,510	24,250	33,250	29,510	36,990	36,990
14.....	20,190	14,810	10,560	13,360	11,680	24,250	17,190	41,750	36,310	26,520	26,190	26,190
15.....	16,890	22,980	10,560	11,960	.....	21,430	16,890	43,110	32,910	24,250	31,550	30,870
16.....	16,290	.....	10,840	11,680	.....	20,500	15,100	41,750	32,910	22,360	25,530	25,530
17.....	15,100	19,990	10,840	10,560	9,730	23,610	14,520	26,850	26,850	22,360	24,890	24,890
18.....	14,520	.....	13,940	10,000	9,460	15,990	13,650	24,890	26,850	23,290	23,980	23,980
19.....	14,520	.....	.....	10,280	12,360	24,670	11,680	23,610	22,360	.....	27,840	27,840
20.....	13,940	36,310	.....	10,000	12,360	22,980	10,000	20,500	22,360	22,360	22,360	22,360
21.....	13,940	8,920	.....	10,000	10,000	22,980	10,000	20,500	22,360	22,360	22,360	22,360
22.....	15,390	17,490	.....	10,000	10,000	16,890	9,460	21,120	22,360	22,360	24,890	24,890
23.....	14,520	15,100	10,280	9,730	9,730	16,890	12,240	19,590	22,980	22,980	22,980	23,610
24.....	13,940	13,940	10,000	9,730	9,730	19,990	26,850	10,560	22,670	21,120	22,980	21,120
25.....	12,800	13,940	10,000	11,680	15,690	32,910	32,910	26,190	29,510	21,740	21,740	23,610
26.....	12,800	13,360	10,000	13,360	9,190	11,680	27,840	12,800	29,510	22,980	23,610	23,610
27.....	24,890	12,800	10,000	10,560	10,560	14,520	27,510	13,360	28,170	23,250	22,980	25,210
28.....	.....	12,240	10,000	9,730	10,000	14,520	24,250	28,170	28,170	33,250	21,120	33,250
29.....	15,390	.....	10,000	10,560	9,460	14,230	13,940	32,230	26,850	30,190	24,890	24,890
30.....	14,520	.....	13,650	10,560	11,960	.....	11,960	32,230	.....	32,230	.....	28,830
31.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Maximum	24,890	36,310	13,940	15,690	12,800	34,610	75,070	48,550	36,310	92,750	52,530	52,530
Minimum	12,800	16,792	10,000	9,730	9,190	8,380	8,920	10,560	22,050	20,190	14,810	14,810
Mean..	16,595	16,792	11,110	11,300	10,663	17,291	20,336	31,157	26,993	30,141	27,408	27,349

NOTE.—No record on days for which discharge is not given. The probable discharge on October 16, 1924 is 219,910 second-liters.

*Daily and monthly discharges, in liters per second, of Libungan River near Eual Farm School, Libungan, Cotabato, for the year 1921*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.	26,190	22,980	21,120			22,980	23,290					
2.	32,230	20,810	23,290			25,860	30,870					
3.	24,570	19,990	22,360			28,170	28,170					
4.	22,060	18,690	22,360			27,180	26,860					
5.	21,120	16,290	21,740			25,210	25,210					
6.	17,490	14,520	20,500		22,360	22,980	22,980					
7.	15,690	14,230	24,890		22,360	88,330	27,510					
8.	14,810	13,940	23,610		22,980	85,950	28,170					
9.	14,520	13,940	19,890		22,050	71,950	26,860					
10.	15,320	21,830	17,820		21,140	75,950	27,170					
11.	15,360	21,830	24,890		23,290	72,350	27,170					
12.	18,390	42,620	24,890		22,980	67,370	28,170					
13.	20,190	43,790	21,250		22,980	57,390	29,510					
14.	21,740	46,510	19,590		72,350	47,870	28,830					
15.	21,120	41,750	23,610		22,360	24,890	27,180					
16.	20,500	40,390	25,210		58,070	31,890	26,190					
17.	24,250	37,670	23,290		67,250							
18.	27,510	36,990	28,830		87,850	31,210						
19.	22,980	33,250	30,190		118,930	36,310						
20.	22,670	29,510	32,570		74,050	32,230						
21.	36,310	31,550	34,610		40,390	32,230						
22.	41,070	31,550	36,463		33,590	34,950						
23.	31,890	26,850	38,350		29,510	34,270						
24.	28,890	23,610	38,590		36,990	45,830						
25.	29,510	22,670	30,870		32,230	35,950						
26.	39,110	20,810	26,820		31,550	31,550						
27.	13,360	20,500	23,890		31,550	26,860						
28.	42,620	19,890	23,610		40,150	27,830						
29.	52,630		22,980		56,710	21,530						
30.			21,740		56,010	26,210						
31.	25,530											
Maximum	52,630	82,890	38,350		118,930	91,390	30,870					
Minimum	13,360	13,940	19,590		21,740	22,980	22,980					
Mean	26,213	29,022	25,488		41,775	46,120	27,300					

NOTE.—No record on days for which discharge is not given.

## COTABATO PROVINCE

## MAGANOF RIVER, MAGANOF

**LOCATION.**—About 50 m. northwest of Maganoy Farm School, and about 20 m. south of the Trading System of Maganoy, which is on the other side of river.

**RECORDS AVAILABLE.**—From August 17, 1919, to August 3, 1921.

**GAGE.**—Vertical gages of two sections both braced at the right bank of the river.

**DISCHARGE MEASUREMENTS.**—Made from boat at section of gage B.

**CHANNEL AND BANKS.**—Channel only one at all stages; straight for 50 m. above and below the station. Banks composed of alluvial soil and bare from vegetation. Stream bed subject to change at each flood. Flow uniform.

**EXTREMES OF DISCHARGE.**—Maximum discharge recorded during period of observation, 1,018,050 second-liters on October 14, 1920; minimum discharge, 18,760 second-liters on January 25–27 and 29, 1921.

**DIVERSIONS.**—None.

**REGULATION.**—None.

**UTILIZATION.**—For irrigation purposes.

**ACCURACY.**—Daily discharge determined from a fairly well-defined curve from 37,000 to 67,000 second-liters. Applicable throughout period of observation. Station fair. Gage read twice daily.

*Discharge measurements of Maganoy River, near Maganoy Farm School, Maganoy, Cotabato*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1919</b>				
August 17...	A. Baldonado and D. Abenes.	70	36,709	.. . . .
September 14 . . . .	.do.	1 65	101,548	
October 29, . . . .	.do.	1 17	66,631	....
November 17..	D. Abenes	1.585	89,290	. . . . .
<b>1920</b>				
January 19 .	.do.	90	47,450	. . . . .
March 21.	.do.	.76	38,828	. . . . .
May 4 . . . . .	.do.	.90	51,614	. . . . .
July 9. . . . .	.do.	84	46,090	. . . . .
September 9 . . . .	.do.	.65	34,915	. . . . .
October 24. . . . .	.do.	1.70	131,784	. . . . .
November 20 .	.do.	96	57,893	. . . . .
December 22 . . .	.do.	.95	52,051	. . . . .
<b>1921</b>				
January 23 . .	.do.	.37	27,015	. . . . .
February 6..	.do.	.39	30,529	. . . . .
March 19.. . . .	.do.	.66	32,549	. . . . .
May 27... . . . .	.do.	.70	13,609	. . . . .



*Daily and monthly discharges, in liters per second, of Maganoy River near Maganoy Farm School, Maganoy, Cotabato, for the year 1920*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	46,250	31,950	31,950	27,400	43,800	57,450	37,000	24,850	24,850	43,800	73,700	62,052
2	46,875	31,000	30,550	28,900	42,800	54,875	35,850	25,425	24,420	39,200	65,026	53,000
3	40,875	30,000	29,500	28,000	42,800	54,875	35,850	25,425	24,420	39,200	65,026	53,000
4	40,875	29,000	28,500	27,000	41,800	53,875	34,850	24,420	23,420	38,200	64,026	52,000
5	53,725	29,000	28,500	27,000	41,800	53,875	34,850	24,420	23,420	38,200	64,026	52,000
6	53,725	28,000	27,500	26,000	40,800	52,875	33,850	23,420	22,420	37,200	63,026	50,875
7	47,550	28,000	27,500	26,000	40,800	52,875	33,850	23,420	22,420	37,200	63,026	50,875
8	48,200	27,500	27,000	26,000	40,800	52,875	33,850	23,420	22,420	37,200	63,026	50,875
9	47,550	27,500	27,000	26,000	40,800	52,875	33,850	23,420	22,420	37,200	63,026	50,875
10	47,550	27,500	27,000	26,000	40,800	52,875	33,850	23,420	22,420	37,200	63,026	50,875
11	46,250	27,500	27,000	26,000	40,800	52,875	33,850	23,420	22,420	37,200	63,026	50,875
12	46,250	27,500	27,000	26,000	40,800	52,875	33,850	23,420	22,420	37,200	63,026	50,875
13	46,250	27,500	27,000	26,000	40,800	52,875	33,850	23,420	22,420	37,200	63,026	50,875
14	95,600	31,000	24,450	62,050	51,550	63,600	36,475	55,950	31,950	1,018,050	65,200	129,100
15	73,700	32,425	24,450	55,950	46,250	57,450	34,900	53,725	45,000	560,925	62,050	116,900
16	58,950	65,200	46,250	40,300	43,200	53,000	33,400	66,850	47,550	355,650	62,825	74,600
17	55,200	65,200	34,400	58,950	43,800	45,000	34,900	60,500	142,400	221,100	55,950	63,600
18	50,200	98,975	28,300	48,300	37,000	40,375	35,950	42,600	405,675	203,850	55,950	58,200
19	46,875	100,100	26,550	34,900	46,875	41,450	34,400	45,625	136,300	147,150	68,500	50,200
20	45,000	97,450	26,550	31,000	45,000	53,000	31,950	43,800	97,850	124,900	51,550	46,250
21	41,450	46,250	39,750	28,300	77,300	76,400	29,200	42,600	71,900	245,250	48,850	35,950
22	35,950	48,850	43,800	28,300	73,700	70,200	28,750	41,450	55,950	215,925	46,250	31,950
23	38,650	45,625	34,900	28,300	59,725	79,200	27,850	34,900	47,550	136,300	51,550	30,100
24	40,875	50,200	28,300	25,700	47,550	70,200	26,550	29,650	100,100	116,900	50,200	29,650
25	40,300	43,200	27,400	25,700	46,875	70,200	26,550	29,650	100,100	116,900	50,200	29,650
26	37,000	38,100	26,550	25,275	78,250	75,725	26,700	28,300	73,700	91,300	48,200	29,200
27	35,950	36,475	24,850	24,450	69,350	50,875	25,275	24,050	55,350	310,800	49,625	29,200
28	37,000	34,900	24,850	23,650	65,200	46,250	25,700	26,550	65,200	203,850	48,200	29,200
29	34,900	33,400	23,250	22,850	62,825	46,250	25,275	25,700	42,600	150,450	48,200	28,750
30	33,900	33,400	23,050	23,050	51,550	38,650	25,275	25,700	42,600	110,825	46,250	28,750
31	32,900	24,850	24,850	24,850	43,800	36,850	24,850	24,850	43,800	111,850	52,375	27,300
Maximum	122,100	100,100	47,550	62,050	124,900	81,100	71,900	66,850	405,675	1,018,050	237,000	186,600
Minimum	32,900	25,200	23,250	22,850	37,000	34,900	24,050	24,050	24,450	39,200	46,250	27,350
Mean	49,614	43,376	29,462	33,974	60,541	53,392	37,016	36,723	64,798	202,528	93,241	56,784

*Daily and monthly discharges, in liters per second, of Maganoy River near Maganoy Farm School, Maganoy, Cotabato, for the year 1921*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	27,850	30,100	80,150	39,200	207,300	105,375	86,000	90,225				
2	28,300	31,950	63,600	37,000	81,900	176,250	142,400	100,100				
3	28,300	22,450	68,950	34,900	68,500	155,550	104,700	124,900				
4	27,400	24,850	55,950	33,400	137,800	228,000	100,100					
5	26,550	26,550	48,850	33,400	212,475	165,900	101,225					
6	24,850	22,050	45,000	32,900	231,450	174,525	93,450					
7	24,450	21,650	63,600	45,000	210,750	155,550	78,100					
8	24,050	20,200	77,300	47,550	127,700	203,850	71,900					
9	26,125	19,120	58,200	43,800	92,375	200,400	123,500					
10	25,700	66,025	53,700	43,800	73,700	193,500	193,500					
11	25,275	35,425	61,275	37,000	69,600	203,850	155,550					
12	24,050	29,200	47,550	111,850	54,450	224,550	127,700					
13	23,250	28,300	45,625	89,150	58,950	255,600	136,300					
14	22,850	24,050	37,550	57,450	58,950	214,200	107,050					
15	22,850	24,050	75,500	48,850	62,825	165,900	124,900					
16	24,850	23,650	65,200	46,250	259,050	203,850	186,600					
17	24,450	23,250	78,250	43,800	246,375	143,950	162,450					
18	24,050	22,450	107,050	46,870	252,150	352,200	334,950					
19	23,250	20,920	186,600	68,500	159,000	352,200	343,575					
20	22,450	24,850	119,500	66,025	97,850	383,250	291,825					
21	21,650	34,900	101,225	89,150	93,450	262,500	262,500					
22	21,285	55,200	97,850	122,100	108,225	241,800	229,725					
23	21,285	94,525	85,000	148,800	133,300	203,850	165,900					
24	20,200	62,050	159,000	136,300	136,300	183,150	102,350					
25	18,760	102,350	55,200	130,500	130,500	159,000	88,075					
26	18,760	89,150	63,000	73,900	100,100	124,900	87,000					
27	18,760	70,200	60,500	65,200	179,600	91,300	86,000					
28	21,285	62,825	53,700	65,200	107,050	110,575	91,300					
29	18,760		43,800	102,350	119,500	107,050	109,400					
30	21,650		40,300	217,650	229,725	97,850	86,000					
31	32,900		35,425		205,575		88,075					
Maximum	32,900	145,500	186,600	217,650	259,050	383,250	343,575	124,900				
Minimum	18,760	19,120	35,425	32,900	54,450	91,300	71,900	90,225				
Mean	23,748	42,706	68,305	74,352	138,744	187,028	143,939	105,075				



## COTABATO PROVINCE

## MALITIBUG RIVER, BAO

**LOCATION.**—About 50 m. north of Bao Camp and about 150 m. east of school. It is exactly on the river crossing of the trail from Bao to Malagap.

**RECORDS AVAILABLE.**—From August 25, 1919, to August 3, 1921.

**GAGE.**—Vertical staff made out from log of "bagaclo" tree, planed on one side and tied with wires to "baboñganin" tree on right bank of river.

**DISCHARGE MEASUREMENT.**—Made by wading at section of gage.

**CHANNEL AND BANKS.**—Channel only one at all stages; straight for 150 m. above and below the station. Banks clayey and subject to overflow only at exceptional floods. Stream bed plenty of stones and boulders, and permanent in character.

**EXTREMES OF DISCHARGE.**—Maximum discharge recorded during period of observation, 311,000 second-liters on April 27, 1921; minimum discharge, 4,750 second-liters on January 11, 1921.

**DIVERSIONS.**—None.

**REGULATION.**—None.

**UTILIZATION.**—For irrigation purposes.

**ACCURACY.**—Daily discharge determined from well-defined curves, applicable throughout period of observation. Station fair. Gage read twice daily.

*Discharge measurements of Malitibug River, near Bao, Cotabato*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1919</b>				
August 25 .	Antonio Baldonado	0 38	10,343	
September 18 .	D. Abenes	0 64	29,628	
October 22 .	do	0 44	16,387	
November 23.	do.	0 65	33,668	
December 19	do	0 47	17,924	
<b>1920</b>				
January 27..	do	0 39	14,938	
February 27. .	do	0 34	9,239	
March 29	do	0 31	9,680	
May 14.	do	0 46	16,425	
June 7.	do	0 48	19,717	
July 19	do	0 44	15,922	
August 18 .	do	0 47	17,915	
September 22.	do.	0 70	40,198	
October 17.	do.	0 73	43,987	
December 14	do.	0 65	31,178	
<b>1921</b>				
January 12 .	do	0 40	7,200	
February 13..	do.	0 42	11,300	
March 19 .	do	0 66	32,549	
May 27.	do	0 70	33,464	

Daily and monthly discharges, in liters per second, of Malitbug River near Bao, Cotabato, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....									13,030	128,150	66,150	17,670
2.....									13,030	131,150	45,150	15,180
3.....									13,030	71,150	27,240	15,780
4.....									13,030	36,150	19,080	20,470
5.....									13,030	21,990	15,780	17,670
6.....									15,780	27,240	18,340	16,400
7.....									19,030	45,150	70,150	16,400
8.....									19,030	20,470	61,150	37,150
9.....									20,470	15,180	37,150	56,150
10.....									19,030	14,060	49,150	43,150
11.....									17,670	13,030	145,150	33,150
12.....									43,150	13,030	71,150	19,030
13.....									41,150	13,030	67,150	16,400
14.....									63,150	13,030	39,150	60,150
15.....									57,150	13,530	33,150	39,150
16.....									20,470	13,030	37,150	31,150
17.....									17,670	13,030	41,150	27,240
18.....									37,150	12,080	32,150	19,030
19.....									49,150	12,080	29,150	19,030
20.....									37,150	12,080	25,410	19,030
21.....									25,410	14,060	41,150	16,400
22.....									32,150	17,020	63,150	15,180
23.....									39,150	28,180	43,150	16,400
24.....									35,150	21,220	38,150	15,180
25.....								13,030	33,150	37,150	39,150	13,530
26.....								13,530	29,150	39,150	25,410	13,030
27.....								14,060	115,150	33,150	44,150	13,080
28.....								13,530	63,150	41,150	37,150	14,060
29.....								13,030	57,150	49,150	30,150	14,610
30.....								13,030	75,150	55,150	21,990	14,060
31.....								14,060		119,150		13,530
Maximum.....								14,060	115,150	131,150	145,150	60,150
Minimum.....								13,030	13,030	12,080	15,780	13,030
Mean.....								13,467	34,904	35,231	43,455	22,489

Daily and monthly discharges, in liters per second, of Malitbug River near Bao, Cotabato, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	14,060	13,580	10,780	15,180	30,150	66,150	12,540	15,400	27,240	15,180	45,860	8,600
2.....	13,580	13,580	10,360	14,060	17,670	103,150	13,150	15,180	25,410	19,030	29,800	11,600
3.....	20,790	13,580	19,860	16,400	38,150	65,150	43,120	14,060	23,640	27,240	22,600	53,860
4.....	20,790	13,580	19,860	16,400	34,150	89,150	48,150	13,030	21,220	24,510	23,200	35,450
5.....	79,150	13,030	9,600	19,030	37,150	24,510	47,150	12,080	20,470	19,500	19,500	23,700
6.....	23,640	12,540	9,600	19,030	25,410	20,470	28,180	11,640	17,670	16,400	14,850	17,600
7.....	19,030	22,800	9,600	15,180	20,470	19,030	21,990	13,030	15,180	16,400	10,100	18,550
8.....	19,030	34,150	16,400	13,530	16,400	35,150	20,470	13,030	14,060	261,700	14,850	14,850
9.....	16,400	27,240	17,670	12,080	16,400	27,240	17,670	12,080	14,060	108,000	29,800	14,000
10.....	16,400	22,800	14,060	11,640	17,670	41,150	16,400	11,640	25,410	163,100	27,300	13,200
11.....	27,240	19,030	11,640	27,240	16,400	53,150	17,670	11,640	49,150	119,600	22,600	10,100
12.....	31,150	17,670	11,200	32,150	16,400	51,150	15,180	12,080	51,150	108,000	13,200	8,600
13.....	51,150	17,020	11,200	25,410	15,180	41,150	15,180	15,180	56,150	102,200	10,100	8,600
14.....	47,150	20,470	12,080	25,410	17,020	55,150	14,060	20,470	37,150	70,700	11,600	11,600
15.....	41,150	36,150	20,470	20,470	14,610	57,150	13,530	22,800	39,150	70,700	11,600	16,550
16.....	21,980	39,150	16,400	20,470	13,530	37,150	13,530	22,800	39,150	22,600	10,100	16,550
17.....	19,030	20,470	16,400	20,470	13,530	37,150	13,530	22,800	39,150	22,600	10,100	16,550
18.....	15,730	16,400	13,030	17,670	11,640	17,020	13,030	19,030	67,150	12,400	8,600	10,850
19.....	15,730	16,400	13,030	17,670	11,640	17,020	13,030	19,030	67,150	12,400	8,600	10,850
20.....	14,060	15,150	16,400	14,060	39,150	15,180	13,030	17,670	47,150	119,600	7,200	7,200
21.....	14,060	15,150	16,400	14,060	26,320	13,530	14,060	15,730	41,150	115,800	6,550	7,200
22.....	14,060	16,400	15,180	16,400	20,470	29,150	15,530	15,180	51,150	108,000	6,550	6,550
23.....	13,530	15,180	14,060	13,030	75,150	51,150	13,030	19,030	44,150	84,800	47,800	6,550
24.....	15,180	14,060	13,530	13,030	65,150	35,150	13,530	23,640	34,150	53,800	49,740	6,550
25.....	14,060	14,060	12,080	11,200	37,150	21,990	13,030	17,670	22,800	32,550	32,550	6,550
26.....	14,060	13,030	11,640	13,030	31,150	18,340	11,640	15,180	21,990	14,850	24,900	11,600
27.....	13,530	11,200	11,200	16,400	20,470	14,060	11,640	13,530	26,320	16,600	16,600	10,850
28.....	16,400	11,200	10,360	13,030	16,400	23,640	11,200	12,080	21,990	29,800	10,100	10,100
29.....	15,180	10,780	10,360	17,670	14,060	23,640	11,200	13,530	19,030	29,800	10,100	10,100
30.....	15,180	.....	12,080	15,180	137,150	13,530	14,060	12,400	17,670	13,550	12,400	9,350
31.....	14,060	.....	13,030	.....	127,150	.....	.....	11,640	.....	49,740	.....	.....
Maximum.....	79,150	39,150	20,470	32,150	131,150	103,150	48,150	23,640	97,150	261,700	49,740	53,800
Minimum.....	13,530	10,780	9,600	11,200	11,640	13,530	11,200	11,640	14,060	7,900	5,900	6,550
Mean.....	22,238	18,546	12,944	17,166	31,838	35,666	17,704	15,397	35,975	60,477	18,593	14,045

NOTE.—Discharge determined from well-defined rating curve, applicable as follows: August 25, 1919, to October 7, 1920, good between 16,000 to 30,000 second-liters; October 8, 1920, to August 3, 1921, good between 7,000 to 45,000 second-liters.

Daily and monthly discharges, in liters per second, of Malibug River near Bao, Cotabato, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	9,350	10,850	60,550	8,600	27,300	14,000	7,200	6,550	..	..	..	..
2	8,600	8,600	32,550	7,200	19,550	13,200	6,550	6,550	..	..	..	..
3	8,600	7,900	22,600	7,200	14,850	10,100	20,500	5,900	..	..	..	..
4	7,900	7,200	16,650	6,550	11,600	7,900	16,650	5,900	..	..	..	..
5	7,200	8,600	12,400	6,550	7,200	10,100	14,850	..	..	..	..	..
6	7,200	8,600	10,100	8,600	6,550	13,200	13,200	..	..	..	..	..
7	7,200	7,200	7,900	10,100	5,900	10,100	11,600	..	..	..	..	..
8	11,600	6,550	7,900	8,600	8,600	8,600	11,600	..	..	..	..	..
9	10,100	51,700	10,200	14,850	5,900	7,200	11,600	..	..	..	..	..
10	14,750	34,000	10,100	23,800	13,200	5,900	17,300	..	..	..	..	..
11	4,750	17,300	8,600	23,800	11,650	5,900	16,650	..	..	..	..	..
12	7,200	14,850	7,200	13,550	11,600	34,000	23,800	..	..	..	..	..
13	7,200	14,850	7,200	13,550	10,100	84,000	38,600	..	..	..	..	..
14	6,550	11,600	6,550	10,100	8,600	47,800	31,600	..	..	..	..	..
15	6,550	12,400	6,550	10,100	7,200	42,100	81,800	..	..	..	..	..
16	6,550	13,200	35,450	7,200	6,550	35,450	53,800	..	..	..	..	..
17	6,550	13,200	116,700	7,200	6,550	45,360	28,500	..	..	..	..	..
18	6,550	10,100	110,900	6,550	6,550	90,600	17,600	..	..	..	..	..
19	6,550	8,600	102,200	5,900	5,900	79,000	13,200	..	..	..	..	..
20	10,100	20,500	90,600	14,850	5,900	68,050	16,650	..	..	..	..	..
21	8,600	18,550	81,900	38,650	5,900	137,000	70,700	..	..	..	..	..
22	7,200	22,600	68,050	27,300	16,650	108,000	60,550	..	..	..	..	..
23	13,200	22,600	56,000	20,500	14,850	68,050	43,980	..	..	..	..	..
24	11,600	60,550	43,980	16,650	13,200	49,740	26,100	..	..	..	..	..
25	8,600	68,050	32,550	12,400	11,600	42,100	16,650	..	..	..	..	..
26	7,200	128,300	24,900	9,350	17,600	27,300	14,000	..	..	..	..	..
27	7,200	105,100	18,550	311,000	35,450	18,550	11,600	..	..	..	..	..
28	7,200	84,800	16,650	154,400	29,800	14,850	10,100	..	..	..	..	..
29	6,550	..	14,850	84,800	26,100	11,600	8,600	..	..	..	..	..
30	6,550	..	13,200	38,650	20,500	9,350	7,200	..	..	..	..	..
31	13,200	..	10,100	..	16,650	..	6,550	..	..	..	..	..
Maximum.	13,200	128,300	116,700	311,000	35,450	137,000	84,800	6,550	..	..	..	..
Minimum	4,750	6,550	6,550	5,900	5,900	5,900	5,900	5,900	..	..	..	..
Mean.	8,086	28,771	34,236	31,232	13,226	37,368	23,340	6,333	..	..	..	..

NOTE.—See footnote to discharge table for 1920.

## COTABATO PROVINCE

## NITOAN RIVER, PARANG

**LOCATION.**—About 1.5 km. southeast of Parang Camp and exactly on north side of bridge over Nitoan River of the Parang-Buldung trail.

**RECORDS AVAILABLE.**—From August 8, 1919, to September 30, 1921.

**GAGE.**—Board .02 × .04 × 2.3 m. graduated with nails, horizontally nailed to the floor beam of bridge. Water surface elevation measured with chain and weight.

**DISCHARGE MEASUREMENTS.**—Made from bridge.

**CHANNEL AND BANKS.**—Channel straight for 80 m. above and below the station. Only one at low water stage, two at high right bank of hard rock; left bank of loose earth, and easily eroded. At measuring section stream bed liable to change after each flood. Flow not uniform due to rapids in channel.

**EXTREMES OF DISCHARGE.**—Maximum discharge during period of observation, 254,250 second-liters on October 14, 1920; minimum discharge, 15,000 second-liters on April 4, 1921.

**DIVERSIONS.**—None.

**REGULATION.**—None.

**UTILIZATION.**—For irrigation purposes.

**ACCURACY.**—Daily discharge determined from fairly well-defined rating curves. Applicable throughout the period of observation. Gage read twice daily.

*Discharge measurements of Nitoan River, near Parang, Nitoan, Cotabato*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1919</b>				
August 9	A. Baaldonado and D. Abenes	1 29	41,581	
September 9	do.	1 37	55,447	
October 6	do.	1 60	69,748	
November 7	do.	1 57	77,103	
December 5	do.	1 24	36,451	
<b>1920</b>				
January 13	D. Abenes	1 38	40,432	
February 8	do.	1 35	36,418	
March 8	do.	1 25	27,808	
April 10	do.	1 13	22,380	
April 28	do.	1 15	24,268	
May 23	do.	1 15	22,043	
June 1	do.	1 16	20,429	
July 3	do.	1 43	60,225	
August 3	do.	1 18	23,409	
September 30	do.	1 30	35,549	
October 31	do.	1 44	46,491	
November 1	do.	1 42	41,517	
November 10	do.	1 46	68,192	
<b>1921</b>				
January 1	D. Abenes	1 44	62,464	
February 27	do.	1 21	20,157	
March 2	do.	1 38	50,880	
April 2	do.	1 20	23,488	

Daily and monthly discharges, in liters per second, of Nitoan River near Nitoan, Parang, Cotabato, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.									34,050	56,740	39,550	34,810
2.									33,290	64,870	46,440	33,290
3.									34,810	59,720	41,250	39,550
4.									36,390	56,760	41,250	34,810
5.									33,290	53,800	39,550	35,600
6.									36,390	59,720	48,240	34,060
7.									42,950	53,800	61,780	33,290
8.								37,180	41,250	72,890	82,810	34,810
9.								37,970	44,680	66,810	61,780	37,180
10.								39,550	39,550	59,720	49,160	37,180
11.								39,550	70,980	59,720	49,160	37,180
12.								35,600	70,980	53,800	44,680	33,290
13.								35,600	93,680	50,080	44,680	34,810
14.								34,810	75,750	50,080	43,800	34,810
15.								34,810	51,000	52,860	42,100	37,180
16.								33,290	46,440	50,080	41,250	34,060
17.								33,290	48,240	43,800	40,400	33,290
18.								58,720	46,440	42,950	37,970	31,770
19.								53,800	46,440	42,100	40,400	34,810
20.								42,950	50,080	42,100	40,400	31,770
21.								35,600	45,560	40,400	36,390	34,060
22.								36,390	46,440	47,320	36,390	31,770
23.								46,440	61,780	53,800	35,600	31,770
24.								33,290	57,720	59,720	36,390	31,770
25.								37,970	55,760	58,720	41,250	31,040
26.								36,390	51,920	49,160	36,390	30,310
27.								35,600	59,720	50,080	34,810	34,810
28.								41,250	51,920	48,240	39,550	31,040
29.								36,390	59,720	53,800	36,390	30,310
30.								37,180	.....	47,320	.....	28,850
31.								58,720	93,680	88,650	82,810	89,550
Maximum								58,720	93,680	88,650	82,810	89,550
Minimum								33,290	33,290	40,400	34,810	28,850
Mean								38,783	50,467	54,392	42,722	36,510

Daily and monthly discharges, in liters per second, of Nitoan River near Nitoan, Parang, Cotabato, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.	28,160	33,290	31,770	30,310	39,650	59,720	34,050		35,950	45,250	58,550	47,150
2.	29,580	31,770	27,470	34,810	34,810	53,800	33,290		30,550	43,350	58,550	45,250
3.	33,290	31,770	27,470	28,160	36,390	42,950		31,040	34,750	50,950	54,750	47,150
4.	30,310	28,850	27,470	33,600	41,250	39,550	32,530	30,310	69,950	47,150	126,950	50,950
5.	31,040	28,160	27,470	30,310	37,970	34,050	39,500	36,390	54,750	56,650	90,850	50,950
6.	31,770	28,160	28,850	34,810	42,100	32,530	34,810	33,290	50,950	66,150	85,150	43,350
7.	31,770	27,470	28,160	30,310	43,800	32,530	33,290	33,290	56,650	62,350	77,550	43,350
8.	37,970	36,390	26,090	33,290	41,250	37,180	31,040	31,770	69,950	87,050	69,950	43,350
9.	38,760	36,390	26,090	28,580	42,950	36,390	30,310	31,770	47,150	61,350	77,550	58,550
10.	37,970	28,850	26,090	26,090	36,390	39,550	72,390	29,580	47,150	66,150	69,950	56,650
11.	32,530	27,470	26,090	26,090	40,400	40,400	66,950	31,770	47,150	73,750	66,150	54,750
12.	31,040	27,470	26,780	30,310	34,810	39,550	57,720	30,310	43,350	94,650	66,150	47,150
13.	40,400	27,470	26,780	34,810	32,530	51,920	57,720	34,810	41,450	163,050	62,350	47,150
14.	36,390	36,390	26,090	36,390	38,760	46,440	55,760	36,390	50,950	254,250	58,550	54,750
15.	41,250	24,710	28,850	34,050	32,530	48,240	52,860	34,050	77,550	242,850	62,350	58,550
16.	34,810	61,780	26,780	28,580	31,770	46,440	52,860	33,290	54,750	172,550	58,550	54,750
17.	34,050	48,240	26,090	36,390	33,290	40,400	53,800	37,970	50,905	145,950	58,550	54,750
18.	37,970	39,550	26,090	31,040	30,310	42,950	52,860	42,950	77,550	126,950	58,550	54,750
19.	33,290	36,390	32,530	27,470	33,290	44,680	51,920	42,950	62,350	107,950	58,550	50,950
20.	34,810	36,390	23,550	26,780	34,810	44,680	51,920	50,080	84,750	92,750	58,550	47,150
21.	33,290	33,290	26,780	28,580	30,310	40,180	59,720	42,100	62,350	100,350	58,550	47,150
22.	33,290	31,050	24,710	28,580	28,580	45,950	53,800	45,560	56,650	85,150	58,550	43,350
23.	33,290	31,050	26,780	26,780	26,780	42,950	53,800	46,440	50,950	85,150	58,550	43,350
24.	33,290	33,290	26,780	28,090	26,160	42,950	48,240	46,440	47,150	62,350	50,950	43,350
25.	37,970	31,770	25,100	28,850	30,350	33,290	48,240	38,760	45,250	78,950	52,850	32,530
26.	48,240	31,770	24,710	30,310	30,310	36,390	48,240	36,390	47,150	58,550	62,350	25,250
27.	41,250	31,040	24,710	30,310	28,850	34,810	65,910	36,390	47,150	58,550	60,450	23,550
28.	41,250	31,770	28,160	33,290	26,090	33,290	59,720	34,810	41,450	54,750	62,350	23,550
29.	35,600	29,580	24,710	33,290	26,280	34,810	55,760	31,770	35,950	58,550	52,850	28,750
30.	34,810		24,710	36,390	28,160	33,290	52,860	34,050	35,950	66,150	50,950	
31.	33,290		31,770		28,850		51,920	35,600		64,250		
Maximum	48,240	61,780	32,530	36,390	43,800	70,180	72,390	50,080	77,550	254,250	126,950	58,550
Minimum	28,160	24,710	26,090	26,090	26,090	32,530	30,310	29,580	30,550	43,350	50,950	43,350
Mean	35,249	33,844	26,955	30,779	34,021	41,964	50,123	36,644	51,620	91,840	64,503	43,380

Daily and monthly discharges, in liters per second, of Nitoan River near Nitoan, Parang, Cotabato, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	32,350	16,700	50,950	25,250	35,950	145,950	111,750	142,150	96,550			
2	32,350	23,250	40,050	18,400	35,950	145,950	113,650	130,750	92,750			
3	30,550	16,100	37,750	15,800	39,050	145,950	123,850	126,950	71,850			
4	30,550	21,800	43,350	17,000	32,350	136,450	126,950	134,550	71,850			
5	28,750	21,800		28,750	18,400	136,450	130,750	147,850	69,950			
6	25,250	21,800			18,400	145,950	123,850	119,350	62,350			
7	25,250	25,250	54,750	31,150	32,350	145,950	123,850	84,650	68,050			
8	21,800	21,800	56,650	32,350	32,350	140,250	130,750	80,350	54,750			
9	20,100	21,800	47,150	28,750	30,550	126,950	129,750	76,150	71,350			
10	25,250	28,750	43,350	28,750	32,350	145,950	128,850	73,450	80,350			
11	25,250	28,750	39,550	23,500	32,350	126,950	140,250	69,950	138,350			
12	27,000	47,150	31,150	25,250	32,350	119,350	140,250	66,550	148,250			
13	25,250	43,350	32,350	23,500	35,950	111,750	125,050	58,550	136,450			
14	25,250	47,150	28,750	21,800	35,950	109,850	121,250	53,550	134,550			
15	25,250	47,150	27,000	21,800	34,150	123,150	142,150	52,850	136,450			
16	25,250	47,150	25,250	18,400	32,350	100,350	145,950	50,950	130,750			
17	21,800	54,750	23,500	18,400	37,750	100,350	126,950	50,950	132,650			
18	21,800	54,750	25,250	18,400	35,950	96,550	132,650	64,250	134,550			
19	20,100	54,750	49,050	20,100	35,950	109,850	151,650	50,950	132,750			
20	25,250		49,050	18,400	50,950	126,950	166,850	50,950	130,750			
21	21,800		49,050	35,950	50,950	125,050	168,750	69,950	125,050			
22	21,800		47,150	39,550	50,950	130,750	161,150	54,750	121,250			
23	28,750	87,050	37,750	35,950	54,750	128,850	145,950	54,750	115,550			
24	25,250	85,150	32,350	30,550	62,350	126,950	119,350	56,650	128,850			
25	23,500	88,950	32,350	30,550	54,750	96,550	126,950	62,350	126,950			
26	21,800	58,550	32,350	28,750	106,050	104,150	126,950	62,350	125,050			
27	21,800	50,950	32,350	28,750	134,550	123,850	126,950	54,750	128,850			
28	21,800	62,350	28,750	39,550	145,950	113,650	126,950	69,950	126,950			
29	21,800		28,750	35,950	73,750	109,850	145,950	73,750	138,350			
30	21,800		32,350	32,350	69,950	104,150	126,950	87,050	132,650			
31	18,400		28,750		71,850		130,750	92,750				
Maximum	32,350	88,950	56,650	39,550	145,950	145,950	168,750	147,850	140,250			
Minimum	18,400	16,700	23,500	15,000	18,400	123,350	111,750	50,950	54,750			
Mean	24,498	42,921	33,088	26,923	50,637		134,795	79,327	112,177			



## COTABATO PROVINCE

## PULANGUI RIVER, KABAKAN

LOCATION.—About 60 m. south of the Kabakan School Dormitory and is about 100 m. below the confluence of the Dilapuan with the Pulangui River.

RECORDS AVAILABLE.—From August 30, 1919, to August 4, 1921.

GAGE.—Horizontal staff made out of "Tammag" log and set at the left bank of the river. The fluctuations of water level are being measured with the use of chain and weight.

DISCHARGE MEASUREMENTS.—Made from boat at about 30 m. below gage.

CHANNEL AND BANKS.—Channel only one at all stages; straight for about 200 or 300 m. above and for 100 m. below the station. Right bank low and subject to frequent overflow, covered with "talahib;" left bank of clayey material at top and limestone formation at bottom and is cultivated. Stream bed sandy and shifting.

EXTREMES OF DISCHARGE.—Maximum discharge recorded during period of observation, 795,450 second-liters on June 17, 1921; minimum discharge, 109,750 second-liters on May 3, 1920.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge determined from fairly well-defined curves. The station is a fair one. Gage read twice daily.

*Discharge measurements of Pulangui River, near Kabakan, Cotabato*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1919</b>				
September 24	A. Baldonado and D. Abenas.	3 24	273,991	
October 17...	do.	3 70	352,518	
November 27..	do.	3 13	251,492	
December 23	D. Abenas.	2 92	223,984	
<b>1920</b>				
January 31..	do.	2 62	192,500	
March 2	do.	2 60	183,863	
April 4	do.	1 90	165,859	
May 8.	do.	2 74	205,446	
June 11.	do.	3 46	329,722	
July 16	do.	2 78	179,855	
August 22. .	do.	3 50	569,554	
September 15	do.	3 67	290,738	
October 12. .	do.	5 70	573,768	
November 26	do.	2 81	198,418	
<b>1921</b>				
January 18. .	do.	3 16	209,740	
February 20...	do.	3 80	374,583	
March 15. . .	do.	4 14	378,329	

NOTE.—Discharge measurement made on August 22, 1920, not very reliable as floats have been used to measure the velocity.

*Daily and monthly discharges, in liters per second, of Pulangui River near New Kabakan Farm School, Kabakan, Cotabato, for the year 1919*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.									176,100	687,000	354,000	219,400
2.									173,100	598,500	399,000	211,100
3.									172,100	601,500	270,500	211,100
4.									153,450	482,000	260,700	213,400
5.									177,150	567,000	240,850	240,650
6.									205,350	318,500	318,500	239,300
7.									238,300	603,000	402,000	248,450
8.									238,300	603,000	414,500	248,450
9.									277,800	544,500	361,500	405,000
10.									277,800	485,000	528,000	315,000
11.									269,100	390,000	312,000	270,550
12.									319,540	339,000	310,500	251,150
13.									312,040	306,000	411,000	251,150
14.									255,200	369,000	391,500	248,450
15.									224,300	259,300	319,500	373,500
16.									211,100	444,000	294,000	213,400
17.									288,000	331,500	270,550	201,900
18.									333,000	294,000	249,800	199,700
19.									496,500	264,900	260,700	203,050
20.									483,000	255,200	396,000	206,500
21.									480,000	267,700	414,000	199,700
22.									445,500	321,000	385,500	208,800
23.									339,000	286,500	339,000	230,550
24.									274,900	324,000	300,000	230,550
25.									251,150	375,000	285,050	209,950
26.									243,250	387,500	273,450	259,300
27.									230,550	511,500	255,200	196,400
28.									251,150	372,000	251,150	190,980
29.									336,000	321,000	251,150	186,660
30.									627,000	417,000	225,550	180,300
31.									627,000	462,000	...	178,200
Maximum.								201,900	627,000	687,000	528,000	415,500
Minimum.								184,500	172,100	255,200	253,550	178,200
Mean.								193,200	296,007	418,600	322,423	239,566

Note.—Daily discharge determined from a fairly well-defined curve from 192,500 to 245,200 second-liters. Applicable from September 1, 1919, to June 10, 1920.

*Daily and monthly discharges, in liters per second, of Pulangui River near New Kabakan Farm School, Kabakan, Cotabato, for the year 1920*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	178 200	190 980	209 960	204 200	114 500	211 100	865 400	177 750	212 000	259 500	217 000	213 000
2.....	200 800	182 400	195 300	204 200	112 100	150 720	306 700	165 400	210 000	199 000	230 650	251 700
3.....	209 500	177 150	190 960	196 400	109 750	139 860	328 500	164 450	203 000	193 000	227 500	270 500
4.....	275 500	176 100	186 660	124 310	112 900	218 600	252 300	183 450	182 500	269 400	293 600	307 900
5.....	522 000	175 100	186 660	124 310	112 900	218 600	252 300	183 450	182 500	269 400	293 600	307 900
6.....	498 500	177 100	185 580	120 980	117 700	228 050	233 500	207 000	181 550	270 500	240 100	252 900
7.....	384 000	160 100	185 580	119 330	132 750	220 600	213 700	206 000	183 450	294 700	285 450	244 300
8.....	372 000	243 250	182 400	124 310	197 500	193 140	312 700	205 000	205 000	370 700	295 900	262 900
9.....	346 500	263 500	180 300	125 970	154 480	120 990	298 300	197 000	224 350	425 800	310 300	263 900
10.....	292 500	206 500	178 200	127 650	154 480	162 160	268 300	191 050	217 000	473 000	317 500	267 200
11.....	267 700	185 580	172 100	130 200	158 270	266 100	261 700	199 000	205 000	519 550	269 500	270 500
12.....	288 050	178 200	170 100	131 050	162 160	173 000	211 000	195 000	193 000	538 150	286 950	277 370
13.....	303 000	179 250	168 100	138 900	136 200	173 000	213 000	180 600	183 450	565 400	240 100	259 500
14.....	270 500	177 150	165 100	138 900	147 900	179 650	193 000	198 000	187 000	370 700	245 400	253 500
15.....	275 500	177 150	165 100	138 900	147 900	179 650	193 000	198 000	187 000	370 700	245 400	253 500
16.....	235 500	275 250	208 050	155 420	180 300	207 400	193 000	212 050	206 250	378 800	208 000	268 900
17.....	215 800	429 000	208 800	155 420	156 360	209 000	213 000	210 100	279 700	334 750	210 000	249 600
18.....	208 800	346 500	190 980	145 200	157 300	190 100	208 000	315 100	311 500	294 700	207 000	244 300
19.....	207 650	262 100	183 450	139 800	206 500	179 650	199 000	337 250	291 200	269 400	205 000	240 100
20.....	220 600	223 050	170 100	151 660	234 300	181 550	237 500	283 150	281 700	263 400	215 000	235 900
21.....	229 300	205 350	178 200	151 600	184 500	217 000	265 000	262 000	333 500	299 500	238 000	205 000
22.....	208 800	219 600	176 100	144 300	325 500	250 700	223 800	275 100	329 750	281 200	251 800	201 000
23.....	201 900	223 050	176 100	148 840	225 580	225 400	224 350	266 100	319 900	265 000	243 250	193 000
24.....	286 500	223 050	174 100	156 360	225 580	261 700	207 000	272 800	334 750	259 500	243 250	187 250
25.....	285 050	220 600	172 100	150 720	214 500	270 500	199 000	255 100	339 750	259 500	242 500	181 560
26.....	241 350	203 400	175 100	145 200	207 650	277 200	235 150	268 300	216 400	226 450	216 000	179 650
27.....	241 350	203 400	175 100	145 200	207 650	277 200	235 150	268 300	216 400	226 450	216 000	179 650
28.....	243 250	273 450	182 400	145 200	223 950	316 300	268 300	239 050	235 900	223 350	143 200	213 000
29.....	219 400	230 550	172 100	125 140	223 950	244 300	233 800	240 100	235 900	223 300	140 300	221 200
30.....	201 900	.....	174 100	116 100	208 800	269 500	219 100	218 050	217 000	230 150	172 050	284 300
31.....	195 300	.....	185 580	.....	188 820	.....	219 100	.....	.....	230 650	.....	259 500
Maximum.	525 000	429 000	209 950	204 200	325 500	316 300	365 400	337 250	339 750	538 150	317 500	397 250
Minimum.....	178 200	167 100	165 100	116 100	109 750	120 990	193 000	164 450	181 550	143 700	140 300	179 650
Mean.....	274 487	223 373	181 642	144 761	180 167	211 457	312 106	229 263	244 535	295 624	239 170	273 743

Note.—Daily discharge determined from a fairly well-defined curve from 200,000 to 290,000 second-liters. Applicable from June 11, 1920, to December 31, 1920.

*Daily and monthly discharges, in liters per second, of Pulangui River near New Kabakan Farm School, Kabakan, Cotabato, for the year 1921*

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	228,550	187,250	344,750	208,000	262,800	489,500	231,700	142,800				
2	233,800	205,000	315,100	208,000	197,000	491,000	185,350	150,000				
3	244,300	209,000	373,950	215,000	232,750	539,650	198,000	206,000				
4	248,500	201,000	266,100	200,000	219,100	714,850	207,000	219,100				
5	233,800	194,000	268,300	198,000	247,450	660,800	209,000					
6	246,400	191,050	261,700	197,000	209,000	634,250	200,000					
7	246,400	196,000	259,500	208,000	213,000	705,550	198,000					
8	212,000	200,000	261,700	163,500	153,800	702,450	197,000					
9	207,000	207,000	381,500	128,000	123,750	628,050	182,500					
10	213,000	213,000	538,160	133,950	113,550	620,300	157,200					
11	213,000	227,500	538,160	150,000	110,150	561,400	146,400					
12	328,500	205,000	498,500	192,000	120,350	580,000	169,200					
13	232,750	209,000	407,600	197,000	130,550	699,350	182,500					
14	227,500	207,000	396,410	128,000	142,800	767,550	200,000					
15	242,600	205,000	360,200	150,000	180,600	730,350	208,000					
16	246,400	203,000	441,200	182,500	416,000	725,700	193,000					
17	228,650	203,000	448,200	177,750	420,200	719,450	294,700					
18	250,700	224,350	439,800	150,000	335,600	612,850	293,500					
19	228,550	238,100	438,500	152,000	362,800	612,850	293,500					
20	232,100	238,100	438,500	163,500	273,850	392,250	194,000					
21	202,000	238,100	438,500	180,600	173,850	392,250	194,000					
22	202,000	275,000	409,600	169,500	163,350	317,500	178,950					
23	207,000	319,900	409,600	157,200	189,450	298,900	183,450					
24	199,000	724,750	382,850	159,900	144,600	288,900	187,250					
25	193,000	317,500	471,600	153,600	160,800	282,000	194,000					
26	192,000	317,500	341,150	150,000	153,600	263,900	195,000					
27	211,000	329,750	225,400	146,400	252,900	252,900	199,000					
28	211,000	339,750	215,000	174,900	519,550	270,500	179,650					
29	189,150		211,000	305,500	522,650	229,600	231,700					
30	184,400		208,000	303,100	595,500	231,700	221,200					
31	192,000		207,000		519,550		177,750					
Maximum	328,500	724,750	538,160	305,500	595,500	795,450	294,700	219,100				
Minimum	184,400	187,250	207,000	128,000	110,150	520,000	140,400	142,800				
Mean	224,794	251,818	353,828	180,625	251,734	520,145	204,168	179,475				

Note.—See footnote to discharge table for 1920.

## COTABATO PROVINCE

## SALIMBAO RIVER, SALIMBAO

LOCATION.—About 500 m. east of Cotabato-Parang trail and 4.5 km. northeast of Cotabato.

RECORDS AVAILABLE.—From August 6, 1919, to March 31, 1922.

GAGE.—Made of lauan, set vertically and nailed to "tamunag" tree 60 cm. in diameter.

DISCHARGE MEASUREMENTS.—Made by wading at about 30 m. below gage.

CHANNEL AND BANKS.—Channel only one; straight for 10 m. above and 25 m. below gaging section. Both banks subject to overflow and may be easily disintegrated due to loose composition of earth's texture. At measuring section stream bed sandy and shifting during big floods.

EXTREMES OF DISCHARGE.—Maximum discharge during period of observation, 9,840 second-liters on November 14, 1921; minimum discharge, 12 second-liters, scattered in the months of May, June, and July, 1921.

DIVERSIONS.—None.

REGULATION.—None.

UTILIZATION.—For irrigation purposes.

ACCURACY.—Daily discharge determined from a well-defined rating curve from 40 to 350 second-liters. Below and above these limits the discharges are estimated from extension of curve applicable throughout the period of observation. Gage read twice daily.

*Discharge measurements of Salimbao River, near Salimbao, Cotabato*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1919</b>				
August 6.....	A. Baldonado and D. Abenes.	.59	108	.....
August 11.....	do.	.54	51	.....
September 5.....	do.	.49	37	.....
October 10.....	do.	.69	351	.....
October 11.....	do.	.61	159	.....
November 3.....	do.	.58	211	.....
December 4.....	D. Abenes.	.52	102	.....
<b>1920</b>				
January 5.....	do.	.55	92	.....
January 6.....	do.	.61	171	.....
February 7.....	do.	.57	57	.....
February 15.....	do.	.58	67	.....
March 7.....	do.	.56	39	.....
April 13.....	do.	.61	67	.....
April 27.....	do.	.63	138	.....
May 22.....	do.	.58	32	.....
June 21.....	do.	.77	348	.....
June 29.....	do.	.57	44	.....
July 5.....	do.	.66	120	.....
August 7.....	do.	.54	38	.....
September 3.....	do.	.56	82	.....
October 1.....	do.	.57	47	.....
October 2.....	do.	.57	47	.....
November 3.....	do.	.50	91	.....
November 8.....	do.	.72	642	.....
December 8.....	do.	.50	90	.....
<b>1921</b>				
January 4.....	do.	.47	71	.....
February 2.....	do.	.72	598	.....
March 3.....	do.	.75	715	.....
April 5.....	do.	.44	41	.....
June 25.....	A. Baldonado	.46	207	.....

*Discharge measurements of Salimbao River, near Salimbao, Cotabato—Ctd.*

Date	Made by—	Gage height (meters)	Discharge (second-liters)	Remarks
<b>1921</b>				
August 17.	P. Feliciano	.47	74	
August 20. . . . .	do.	.47	75	
September 21 . . . . .	do.	.50	106	
October 10. . . . .	do.	.62	102	
December 6 . . . . .	do.	.60	144	
December 12 . . . . .	do.	.56	64	
December 12. . . . .	do.	.56	67	
<b>1922</b>				
January 24. . . . .	do.	.54	56	
January 29. . . . .	do.	.54	64	
February 6. . . . .	do.	.53	54	
February 7. . . . .	do.	.53	55	
March 25. . . . .	do.	.51	40	
March 31 . . . . .	do.	.51	36	

Daily and monthly discharges, in liters per second, of Salimbao River near Salimbao, Cotabato, for the year 1919

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.									160	109	84	55
2.									118	118	84	49
3.									128	212	69	
4.									69	972	55	49
5.									37		186	43
6.								109	138		282	43
7.								92	462		906	69
8.								55	310		560	118
9.								49	128		355	118
10.								69	1	173	180	149
11.								69	1,698	92	180	149
12.								62	212	52	74	100
13.								62	118	43	69	160
14.								55	43	69	128	128
15.								43	43	1,038	43	84
16.								37	32	186	100	62
17.								43	32	43	128	55
18.								69	32	43	55	100
19.								560	222	43	62	128
20.								355	222	186	84	84
21.								296	222	118	69	55
22.								239	222	37	100	55
23.								257	222	100	62	49
24.								222	222	100	55	69
25.								160	222	100	49	55
26.								162	32	69	49	55
27.								100	55	43	49	43
28.								84	69	186	69	37
29.								138	37	258	69	37
30.								109		118		43
31.												
Maximum.								560	1,698	1,038	906	160
Minimum.								37	22	37	43	37
Mean.								132	143	184	136	74

NOTE—No record on days for which discharge is not given.

Daily and monthly discharges, in liters per second, of Salimbao River near Salimbao, Cotabato, for the year 1920

Day	January	February	March	April	May	June	July	August	September	October	November	December
1.....	37	62	84	76	100	100			62	84	110	110
2.....	37	55	52	62	100	118			62	84	110	110
3.....	32	69	49	55	109	160			84	84	120	110
4.....	43	69	49	49	100	138			69	84	172	110
5.....	49	84	49	84	100	118			69	106	172	110
6.....	100	69	43	118	100	100			62	84	83	110
7.....	160	55	55	138	100	109		69	62	118	71	83
8.....	478	100	56	100	100	186		69	62	92	750	83
9.....	478	100	55	100	109	128		62	62	100	248	83
10.....	370	76	55	84	100	118		62	186	212	209	83
11.....	239	55	55	100	118	118		63		510	110	96
12.....	138	55	62	138	109	169			92		110	1,126
13.....	160	55	55	138	100	118		63	92		110	518
14.....	118	100	55	100	100	212		212	84		110	518
15.....	198	69	55	138	100	138		173	69		140	166
16.....	138	138	84	160	118	160		160	212		156	110
17.....	160	118	160	212	109	100		118	325		190	110
18.....	173	109	109	212	100	109		92	92		209	96
19.....	173	109	138	118	100	182		840	674		292	96
20.....	149	83	138	118	100	296		186	658		292	96
21.....	100	69	169	184	100			173	239		110	96
22.....	100	100	138	100	100			100	109		270	83
23.....	69	128	118	100	100			92	239		248	83
24.....	138	138	100	138	100			62	355		209	83
25.....	108	118	69	287	100			62	160		172	71
26.....	186	149	62	239	109			62	118		124	71
27.....	173	118	55	160	100			62	100		1,564	71
28.....	149	118	55	128	100			69	100		209	71
29.....	149	100	49	138	109			62	92		140	71
30.....	100	.....	84	138	118			84	.....		.....	71
31.....	69	.....	55	.....	100			.....	.....		.....	.....
Maximum.....	478	149	160	267	118	296		840	674	510	1,564	1,126
Minimum.....	32	55	43	49	92	100		62	62	84	71	84
Mean.....	151	92	74	127	103	139		127	161	137	243	163

NOTE.—Gage damaged on June 22 and was not reinstalled till August 7.



Daily and monthly discharges, in liters per second, of Salimbao River near Poblacion, Salimbao, Cotabato, for the year 1921

Day	January	February	March	April	May	June	July	August	September	October	November	December
1	71	60	836	41	41	..	25	83	172	750	66	75
2	71	83	316	33	792	..	18	13	130	4,792	6,280	186
3	71	73	160	750	424	..	18	239	140	1,240	120	85
4	71	71	83	518	25	..	12	434	172	1,464	58	75
5	71	71	83	518	25	..	41	2,500	110	205	167	167
6	71	83	41	248	18	..	25	668	110	205	167	108
7	71	83	41	248	18	..	25	209	83	205	1,052	85
8	71	83	60	83	12	..	12	172	83	205	2,560	66
9	71	71	140	50	394	..	12	172	83	150	167	66
10	71	71	83	50	668	..	41	248	83	135	254	66
11	60	71	190	50	96	..	25	190	4,606	135	2,780	66
12	83	83	248	41	50	..	41	134	5,932	120	316	66
13	83	83	172	41	341	..	41	83	3,514	120	9,567	66
14	110	71	172	41	83	..	25	71	1,954	167	9,540	66
15	110	..	60	41	836	..	25	71	1,296	167	1,346	66
16	71	60	41	41	316	..	18	71	750	135	1,346	66
17	71	83	41	41	248	..	18	71	172	167	1,346	66
18	71	83	41	41	248	..	41	71	172	167	1,346	66
19	83	83	60	41	2,228	..	33	60	140	135	135	58
20	83	..	60	33	110	..	25	60	140	135	108	66
21	83	..	50	33	71	..	140	60	110	120	85	58
22	83	..	50	33	60	..	590	71	110	230	85	58
23	110	..	83	50	50	..	394	71	110	135	85	58
24	23	190	60	60	881	..	292	71	110	108	96	58
25	83	209	50	50	209	..	156	83	110	120	1,062	58
26	83	518	41	50	60	..	83	71	110	742	186	58
27	71	248	33	50	367	12	172	71	110	254	135	58
28	71	140	41	96	1,126	1,180	124	394	454	75	86	58
29	71	1,564	41	96	292	708	124	454	668	66	86	58
30	60	..	41	83	568	228	124	1,296	1,354	150	75	58
31	60	..	41	60	118	60	124	568	3,358	150	75	58
Maximum	110	1,564	836	750	2,734	1,180	590	2,500	5,932	4,762	9,840	186
Minimum	60	60	33	33	12	12	12	60	83	379	58	51
Mean	78	185	112	96	384	437	94	290	898	379	934	72

NOTE.—No record on days for which discharge is not given.













